

# COMPUTERWORLD

## Novell pumping up services for enterprise needs

By Elisabeth Horwitt  
PROVO, UTAH

Novell, Inc. is getting ready to introduce multiple phases of its campaign to snare the hearts and information systems budgets of rightsizing corporations.

A series of introductions will kick off this month that will map out the network operating system vendor's blueprint for enterprisewide client/server services and applications on the complementary operating systems of NetWare 4.0 and Unix.

The strategic directions, outlined at a briefing here last week, include positioning NetWare as a horizontal server and UnixWare as a vertical server, as well as extending and providing an integrated enterprise slant to NetWare services.

These directions are right on target if Novell wants to be taken seriously as an enterprise systems vendor by large IS shops, said Robin McCubbin, network planning analyst at National Grocers Co. in Toronto.

John Dubiel, manager of planning and tech-  
Novell, page 8

## Doubt clouds IBM 'open' plan

Wary users question diversity of Information Warehouse additions

By Johanna Ambrosio  
SOMERS, N.Y.

IBM's upcoming additions to its Information Warehouse, due in October, will fill in some key gaps — providing a mechanism to get data off the mainframe and onto local-area networks, for example — but some users and analysts question how open the approach is.

The additions will prove to be a mixed bag from an openness standpoint. For example, the copy management software, which will move data from the mainframe to the PC network, will for the time being work only with IBM databases. Still, at least IBM is acknowledging customers' need to move some data to less expensive platforms, observers said.

An IBM executive said eventually the soft-

### WAREHOUSE data

The data warehouse is a central storehouse of data that end users can easily access and manipulate. It can take many forms, from enterprisewide data on mainframes to a departmental database that resides on a server used by relatively few people.

ware will work with other vendors' database engines as well. He gave no time frames.

The other major announcement planned for October is the Information Locator — software designed to help end users figure out what kind of data is in the warehouse so they can ask appropriate questions.

Although the Locator will include information about databases from IBM and other vendors, the Locator will run only under OS/2 and IBM's DB2/2 database management system. It will, however, interface with popular analysis tools, according to Chris Arnold, a marketing executive at IBM's Programming Systems business.

David Beulke, DB2 data administration manager at Spiegel, Inc. in Westmont, Ill., said that  
IBM, page 10

## FCC widens local loop options

By Joanie M. Wexler and Gary H. Anthes  
WASHINGTON, D.C.

A key Federal Communications Commission ruling on the side of competition could knock down prices and improve services for corporate telecommunications shoppers.

The agency last week mandated that regulated local telephone companies allow competitors into their central offices to

route switched traffic to long-distance networks. The action parallels an FCC landmark order last year that opened up this part of the network to competitors seeking to provide leased-line access services [CW, Sept. 21, 1992].

The latest interconnection decision, which opens this market segment to "bypass" carriers such as MFS Communications Co. and Teleport Communications Group, will benefit small and medium-size firms the most, said Henry Levine, an attorney at Levine, Lagapa and Block  
FCC, page 12

### Milestones

1913: TELCOS CAN CONNECT TO THE BELL LONG-DISTANCE NETWORK.

1968: CARTERfone DECISION ALLOWS CONNECTION OF NON-BELL EQUIPMENT TO BELL SYSTEM.

1978: MCI COMMUNICATIONS CORP. AND OTHERS WIN THE RIGHT TO CONNECT TO LOCAL PUBLIC SWITCHED NETWORK TO OFFER LONG-DISTANCE SERVICES.

1993: ALTERNATIVE ACCESS CARRIERS WIN THE RIGHT TO COLLOCATE NETWORKING GEAR AT LOCAL TELEPHONE COMPANY OFFICES AND TO CONNECT TO LONG-DISTANCE NETWORKS FOR DEDICATED SERVICES ONLY.

### CIO turnover

## Job insecurity plagues higher-ups



Bad news. If you're a CIO, you might not want to unpack from your last job. Turnover due to advancements — and firings — is at record highs. Superstars like Progressive Corp.'s Allan Ditchfield (pictured) remain in high demand, but for lesser luminaries, things aren't likely to get better in the near future. See story page 85.

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Newspaper

By Mitch Betts

WASHINGTON, D.C.

### No prescription for medical privacy

## Computerized records: An open book?

The computerized medical records championed by health care reformers will help doctors improve diagnoses, prevent drug interactions and avoid unnecessary tests. But they may also destroy what little medical privacy Americans have unless safeguards are built in at the outset.

At a time when insurance companies, researchers, police, employers, hackers, drug companies, direct marketers, lawyers and reporters are all clamoring to get a peek at medical records, an electronic compilation could set the stage for massive intrusions into private lives, experts said.

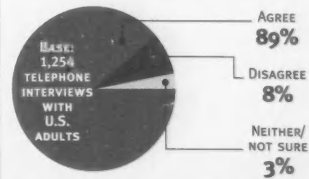
"Americans are losing control over personal information contained in their medical files, which makes it more urgent for the Clinton administration's health care reform

plan to address the privacy issues," said Marc Rotenberg, director of the Washington, D.C., office of Computer Professionals for Social Responsibility.

Privacy, page 14

### Public pulse

A national opinion poll shows the public believes "Computers have made it much easier for someone to obtain confidential personal information about individuals"



Source: 1992 Harris-Exall Consumer Privacy Survey, Atlanta

Recent events suggest the  
administrative burdens of your network  
could grow substantially.





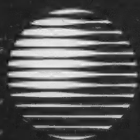


# Are You

# Ready?

It's a jungle out there. And your people are demanding bigger, faster and more diverse services. Like E-mail, video conferencing, LAN interconnection and high-speed data transmission. This means your network is growing in size and complexity. That's why you should call on your local phone company. Your phone company is backed by the products and services of AT&T and AT&T Bell Laboratories. That makes it easier for them to give you the quality and reliability you need. So it'll be easier for you to get your service up. To get all your people hooked up. And to keep your network up. Plus, your phone company can provide all the bandwidth you demand, on demand. So call your local phone company. Because it could mean the difference between data networking and data not working.

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**AT&T**

Network Systems



## NEWS

- E-mail providers pack Groupware '93 with mail-enabled applications. *Page 4*
- IBM and Gateway 2000 embrace electronic software distribution. *Page 6*
- Novell makes the first move in its overall plan to widen data paths through compression and reveals an outline of long-term strategy for integrated network and systems management. *Page 8*
- Notes from the floor at MacWorld. *Page 12*

- Unisys and Intel team up to develop a scalable parallel processing system for high-end commercial use. *Page 16*
- Big Three automakers and national laboratories tackle application software for massively parallel computers. *Page 16*
- MFS Datanet springs a surprise: a 14-city ATM network that's already up and running. *Page 24*

## ADVANCED TECHNOLOGY

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## DESKTOP COMPUTING

- Expect a wait for color notebooks: Demand outstrips all predictions. *Page 41*



- A test drive of 1-2-3 for Windows shows that this time, Lotus did Windows right. *Page 46*

## WORKGROUP COMPUTING

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## ENTERPRISE NETWORKING

- IBM puts its ATM strategy in context by outlining the near-term fate of its SNA-oriented gear. *Page 61*



## The CW GUIDE

- Most people realize too late that they're not prepared for a LAN disaster. Tape backup systems, power supplies and an alternative operations site are only part of what you'll want to have on hand — before the crash. *Page 93*
- Buyers' Scorecard: Cheyenne and Platinum score highest in user satisfaction ratings of top-selling tape backup systems. *Page 99*
- Firing Line: BusLogic's Chantal RAID software is inexpensive and nonproprietary, users say, but the documentation could use work. *Page 101*

## LARGE SYSTEMS

- Recent HP price cuts on high-end Unix mini-computers clear room for more powerful models later this year. *Page 69*

## APPLICATION DEVELOPMENT

- IBM is sold on object-oriented programming for the AS/400, but users aren't so sure. *Page 77*

## MANAGEMENT

- CIO job-life expectancy is plunging, and

there's little prospect of improvement. *Page 85*

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## CAREERS

- How are careers in network management made? By accident, mostly. *Page 109*

## MARKETPLACE

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## COMPUTER INDUSTRY

- Unix, desktop and distributed systems start to pay off for Computer Associates. *Page 123*

## VIEWPOINT AND COMMENTARY

- Patricia Seybold tells the truth about client/server application development: It's damned hard. *Page 33*
- IS professionals can help upgrade the U.S. education system, says Computerworld Publisher Gary Beach. *Page 33*
- Charles Babcock talks about how much tougher supporting widespread mobile computing can get and the LAN improvements you should start asking for now. *Page 36*
- Love and network technology adoption go through predictable stages, says Jeffrey Fritz. Right now, we're seeing ATM through a romantic haze. *Page 64*

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## Executive Briefing

Even if you aren't worried about escalating CIO turnover rates (*page 85*), there are other things to keep you up at night... such as what system improvements might be doing to data security.

**The IRS provides** a cautionary tale. A U.S. GAO audit suggests abuse of confidential taxpayer data by employees may have been aided by system modernization efforts. The good news: "Pattern detection" software will be installed. *Page 15*

**Concerns are also surfacing** about the privacy implications of a national medical info network, expected to be a feature of Presi-

dent Clinton's health care reform plan. *Page 1*. Even on a smaller scale, distributed databases are often seen as antithetical to security. The issue tops most lists of IS concerns about client/server computing. This week, two new packages (one an upgrade) promise help in the form of centralized security control. *Page 62*

**Client/server application development** can be a real headache for a

lot of reasons, Patricia Seybold says in her column. *Page 33*. Corporate developers complain about the difficulty of testing applications in complex, multilayered environments. There are some good tools to streamline the process, say developers at Norwest Mortgage and Delta Air Lines, but they can't solve problems of multiple variables interacting with one another. *Page 20*

**Everyone wants to be a facilitator:** DEC is bowing out of the application business and plans to concentrate software development on "frameworks" for tying multiple applications in multivendor client/server environments. *Page 2*. Meanwhile, many PC retailers, seeking brighter business pastures, have transformed

into LAN specialists and LAN/WAN integrators. *Page 106*

**More drama on the benchmark front:** Accusations from rival bidders that it rigs its benchmark results have cost Sun its largest federal contract. *Page 2*

**Real-life tests:** National Grocers in Toronto says beta-testing Novell's NetWare 4.0 was challenging but worthwhile. *Page 61*. CNA Financial assigns a major role to NCR superservers. *Page 53*. Data modeling was key in the creation of the United Nations' global network. *Page 69*. Cigna makes re-engineering pay. *Page 70*

**Wish you could get away** to the quietest place on earth? IBM says it's in Boca Raton, Fla. *Page 31*

# DEC downplays its apps

Middleware focus will attempt to provide common user interface

By Craig Stedman  
MAYNARD, MASS.

Digital Equipment Corp. has finalized plans for de-emphasizing its own applications and focusing software development on "frameworks" for tying together third-party and custom programs.

DEC, which broke up its software engineering group as part of the revamp (see chart), said its software offerings will be made over from all-encompassing, singular products into more of a middleware approach. The end result should provide an architecture and tools for blending multiple applications in multivendor client/server environments.

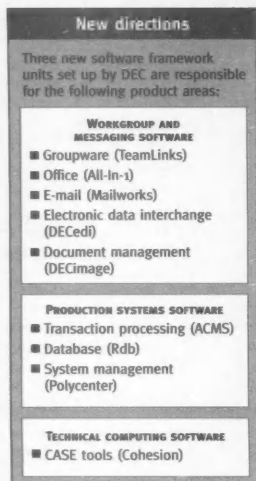
The tools are supposed to allow users to put a common user interface on applications from different sources and provide similar methods of structuring and exchanging data among different applications, the company said. The development shift and the accompanying restructuring took effect in the middle of last month.

## Poker face

However, DEC last week continued to hold the details of the new strategy close to the vest, including its plans for making the frameworks available on Microsoft Corp.'s Windows NT and DEC's OSF/1 operating systems. The company would not specify which applications are slated to be dropped.

Major system-level software

such as the Application Control and Management System transaction processing monitor will continue to be developed, a DEC spokeswoman said. However, analysts said they expect that virtually all end-user applications will be jettisoned or sold off.



"They seem to have learned that it doesn't make sense to go toe-to-toe with their [independent software vendors]," said Neal Hill, senior analyst at Forrester Research, Inc. in Cambridge, Mass. The frameworks approach appears to be aimed mainly at mak-

ing DEC the dominant middleware vendor in the NT market, Hill added. "Long-term, NT is how they're going to stand or fall."

Hill described DEC's new strategy as "high-risk," given the unproven character of NT, but said the decision to give up on the application level was "a wise one, given the situation they find themselves in" financially.

Users said they were uncertain how to view the impending changes due to a lack of information.

## To what effect?

Matt Holdrege, senior network specialist at PacificCare Health Systems, Inc. in Cypress, Calif., said the framework concept sounds appealing but added that he is concerned about the possible impact on the development of products such as the DECedi electronic data interchange package.

"The key to this is to explain it well enough so people understand what it is that's there," noted George Reid, MIS director at Sanford C. Bernstein & Co. in New York. He added he has yet to see a clear explanation of how most of the middleware technology on the market works.

William Strecker, vice president of engineering at DEC and the driving force behind the new strategy, was not available for comment last week. The DEC spokeswoman said the company expects to elaborate on its plans "in the short term," but she would not be more specific.

"We've been given back what we always thought we had under FTS-2000, which is technology refreshment," said David A. Bittenbender, telecommunications branch chief at the U.S. Environmental Protection Agency in Research Triangle Park, N.C., a user of T3 services.

"If the GSA had been prevented from providing T3 [and other new] services, FTS-2000 would have become a useless contract" — and the EPA would have been stuck without T3 service between its supercomputing center and its national computer center here, Bittenbender said.

The decision is "liberating for the planners of FTS-2000," said Steven A. Taylor, president of Distributed Networking Associates, Inc., a consultancy in Greensboro, N.C. "Now FTS-2000 can grow to meet the needs of the individual agencies" rather than forcing agencies to build their own networks and miss out on the price efficiencies of large-scale volume, Taylor said.

Now, with the ruling reversal,

## Government contracts

# NSA sacks Sun as rivals question benchmark results

By Carolyn Duffy Marsan

■ The National Security Agency (NSA) has stripped Sun Microsystems, Inc. of a workstation contract worth several hundred million dollars after rival bidders IBM, Hewlett-Packard Co. and Silicon Graphics, Inc. accused Sun of rigging its benchmark results, industry sources confirmed last week.

The NSA deal, known as the High-Performance Workstation (HPW) II contract, is Sun's largest federal contract. Sun has been the near-exclusive supplier of workstations to the NSA, which is believed to have been Sun's largest customer during the last five years.

Robert Herwick, managing director of technology research at Hambrecht & Quist, Inc., said that if Sun were to lose the NSA's business, the implications would be serious for the company overall.

It is unclear whether Sun will be allowed to participate in a rebidding of the contract. Neither the NSA nor Sun would comment.

Industry sources, however, confirmed that Sun's HPW II contract was suspended last Monday.

"IBM is pleased with NSA's action on its protest and pleased that we will have another opportunity to compete on a revised bid," said Sheila Shanihan, a spokeswoman for IBM's Federal Systems Division.

Tom Steipp, general manager of HP's Federal Computer operation, said, "There was enough substantiation of our concerns and the other protestors' concerns that the procurement was ended," he said.

## Time will prove its worth

Sun won the HPW II contract in early June. Industry sources estimated the worth of the five-year contract at anywhere from \$200 million to \$800 million, depending on how well the NSA's budget fares under the Clinton administration. Sun was the incumbent contractor, having supplied workstations under the NSA's HPW I contract.

The other three bidders promptly protested Sun's performance on the AIM benchmark, which measures the overall performance of Unix systems. Run by AIM Technology, Inc. in Santa Clara, Calif., the benchmark is geared toward floating-point-intensive problems.

Industry sources alleged that in an attempt to outgun its rivals, Sun used random-access memory on its SPARCstation 10 Model 20 to a greater extent than it should have while running the AIM benchmark.

Benchmarking expert Andrew Allison said this kind of scenario does not happen accidentally. But whether a company has "cheated" on a benchmark or merely been "creative" depends on how clearly the government specified the configuration it wanted.

Steipp said HP's protest also questioned whether Sun bid fully commercial equipment, as was requested in the bid, to earn those high benchmark results.

"We didn't do anything wrong or illegal," a Sun source said. "We read the RFP and carefully responded. . . . We have not been barred or precluded from whatever happens next."

Procurement lawyers said the NSA has several options regarding HPW II, including awarding the contract to one of the other three bidders based on their earlier offerings; clarifying the benchmarks with a modification to the original solicitation and asking the four bidders to submit another round of best-and-final offers; or starting the procurement process over.

Marsan is a managing editor at Federal Computer Week, an International Data Group publication.

# Ruling reversal frees federal telecom users

By Joanie M. Wexler  
WASHINGTON, D.C.

The federal government's Federal Telecommunications System 2000 (FTS-2000) network broke out of technological limbo last week after a federal court reversed a year-old decision to exclude high-speed services from the scope of the 10-year telecommunications contract the General Services Administration (GSA) holds with AT&T and Sprint Corp.

Because of protests by rivals MCI Communications Corp. and WorldTel, which were upheld by the GSA Board of Contract Appeals last summer, AT&T and Sprint had been prohibited from providing T3 (45M bit/sec.) transmission services to government agencies under the FTS-2000 contract.

MCI and WorldTel had formally objected to an AT&T/GSA plan to modify the contract to include T3 on the grounds that T3 is a new technology rather than an enhancement to existing dedicated services, such as T1.

This technical interpretation of what constitutes "improving services," which is allowed under FTS-2000, set a dangerous precedent that could have limited the FTS-2000 net to outmoded technology, government users and analysts said.

"This erroneous interpretation overlooks the contractor's obligation to improve Dedicated Transmission Service [sic] as a whole," stated the U.S. Court of Appeals for the Federal Circuit in its decision.

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# Mail vendors converge

## Highlight importance of linking groupware applications

By Michael Vizard  
SAN JOSE, CALIF.

The continuing push by electronic-mail suppliers to leverage their products as an enabling technology for groupware applications will be very much in evidence at Groupware '93 here this week.

Both Lotus Development Corp. and WordPerfect Corp. intend to showcase separate competing initiatives that will highlight the growing importance of linking groupware applications under a common E-mail transport and directory service.

The main advantage of tying groupware to E-mail systems — rather than directly to network operating systems' transport and directory services as is done in some stand-alone packages — comes when users on remotely located local-area networks exchange infor-

mation. That is because the store-and-forward nature of E-mail provides a transport that does not require users to be connected permanently as a dedicated network node.

Lotus will release Version 1.1 of its Organizer personal informa-

tion manager. That is because the store-and-forward nature of E-mail provides a transport that does not require users to be connected permanently as a dedicated network node.

Before opting for Organizer, Stratton said Gulf Canada evaluated Network Scheduler from PowerCore International in San Francisco but chose Organizer because it has a filefax interface and is integrated with CC-Mail.

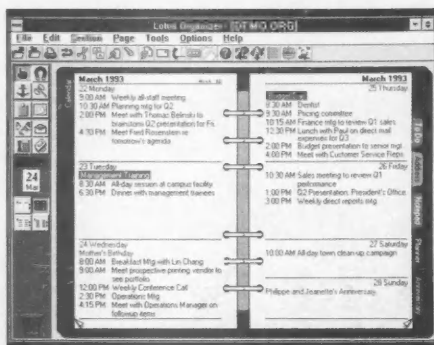
Besides group calendaring and scheduling, Stratton said Gulf Canada intends to serve as a beta-test site for Lotus Forms, which will run on top of CC-Mail rather than adopt any of the forms packages that are available today. Lotus Forms is due in early 1994. WordPerfect

last week it has begun delivering an add-on forms package.

Ultimately, the need to add functionality to E-mail services will drive providers to add a range of services that have thus far been purchased as stand-alone items (see chart above).

How successful providers of forms and conferencing software are in staving off the E-mail providers will depend on how well they can integrate their software with mail directories using standards such as the Vendor Independent Messaging protocol, noted David Ferris, president of Ferris Networks in San Francisco.

Staff writer Lynda Radosevich contributed to this story.



Lotus' Organizer personal information manager has a file-fax interface and is integrated with CC-Mail.

mation manager, which for the first time gives Lotus the ability to provide group scheduling on CC-Mail.

WordPerfect will showcase the integration of four imaging applications that will take advantage of the distributed services in WordPerfect Office 4.0, which offers E-mail, calendaring and scheduling software in the same package [CW, May 17].

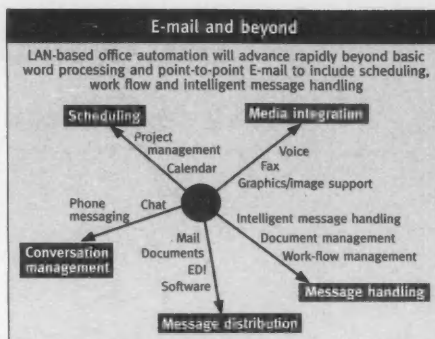
Vendors of the imaging applications include Imagery Software, Inc., PaperClip Imaging Software, Inc., Simplify Development Corp. and Watermark Software, Inc.

Also competing for mind share are Microsoft Corp., which bundles scheduling and mail software in Windows for Workgroups, and Beyond, Inc. in Cambridge, Mass., with its BeyondMail. Beyond has work-flow services and recently added forms software on top of its mail service. Additionally, E-mail vendor On Technology Corp. in Brookline, Mass., also plans to offer blended E-mail and mail-enabled scheduling services across multiple platforms after merging with Network Corp.

Analysts said they like E-mail vendors' chances for success.

"I think the E-mail providers will be extremely successful. They have very aggressive pricing, can leverage suites of applications and share the same mail directories," said Matt Cain, program director at Meta Group, Inc. in Westport, Conn.

For example, Gulf Canada Resources Ltd. in Alberta recently opted to deploy Organizer for 700



Source: Meta Group, Inc., Westport, Conn.

## Postal traffic cops

For companies dealing with E-mail overload, automatically filtering and routing systems can help manage the traffic. To better achieve this, Microsoft will bundle with its E-mail software filtering and absentee notification utilities that were previously sold separately at a premium.

The filtering portion, called Winrules, is a subset of a rules technology from Beyond.

"Winrules is good for simpler tasks, such as filtering E-mail," said Jim Lisiak, a systems engineer at Chevron Information Technology Co. in San Ramon, Calif.

Similar filtering capabilities are also included in the latest release of Lotus' CC-Mail Windows-based E-mail software.

However, for customers developing more complicated applications, such as using E-mail to access information from SQL databases, the full set of capabilities available from Beyond is more appropriate, company President Chuck Digate said.

Included in the bundle is software from Management Software Ltd. that can sort and forward mail to an appropriate destination when users are out of the office. Also, a utility from Systems Compatibility Corp. lets users manipulate attached files even if they do not have the application that created it.

The Microsoft Mail bundle will cost \$995 for a 10-workstation license, which is \$300 more than without the extra utilities, a Microsoft spokesperson said.

— Lynda Radosevich

## Notes phone

Edify Corp. will unveil this week at Groupware '93 a utility designed to allow remote users to more easily access their Notes databases via fax transmissions.

Using the firm's Electronic Workforce software running on a separate fax server, Notes users will be able to use a Touch-Tone phone to instruct a Notes database to send Notes mail to the fax server, which would then transmit those messages.

"As people build work-flow applications around Notes, we're moving toward structured work-flow assembly lines. And if a task needs authorization, people need to be able to access their Notes mail," said Tom Glassanos, vice president of marketing at Edify.

Pricing for the Edify software running on a fax server, which is linked to Notes over an application programming interface, starts at \$20,000 for a server with four phone lines.

— Michael Vizard

## Gateway ties Notes to Mail

By Michael Vizard

Corporate Software, Inc. plans to launch an electronic-mail gateway at Groupware '93 this week that will support bidirectional, native format message transfers between Microsoft Corp.'s Microsoft Mail and Lotus Development Corp.'s Notes mail.

Tentatively called the Mail Express, the gateway is intended to resolve incompatibility issues associated with running Microsoft Mail alongside Notes, the Canton, Mass.-based software distributor and services company said.

"There's a pretty big need for this. I've run into a number of clients with Microsoft Mail

and just about everyone tends to have multiple mail systems," said Norman Weizer, president of Weizer Associates, Inc., a consultancy in Lexington, Mass.

"Microsoft Mail doesn't have a huge percentage of the market [at Notes sites] yet, but it has enough to be a problem," he added.

To help simplify managing diverse Notes and Microsoft Mail installations, the Corporate Software gateway features a directory synchronization service that allows directories to exchange user names.

The gateway costs \$5,000 per Notes server. Maintenance, which is free for the first 90 days, costs \$700 per gateway per year.

### Chosen one

Johnson & Higgins, a New York insurance provider, last week announced it has outsourced software support to Corporate Software. The insurer has more than 100 Notes applications used by 200 users.

**RANK  
1992**

**1991**

**COMPANY**

**1**

**1**

**GENERAL MOTORS** Detroit

**2**

**2**

**EXXON** Irving, Texas

**3**

**3**

**FORD MOTOR** Dearborn, Mich.

**4**

**4**

**INTL. BUSINESS MACHINES**

**5**

**5**

**GENERAL ELECTRIC** Fairfield, Conn.

**6**

**6**

**MOBIL** Fairfax, Va.

**7**

**7**

**PHILIP MORRIS** New York

**8**

**8**

**E.I. DU PONT DE NEMOURS** Wilmington, Del.

**9**

**10**

**CHEVRON** San Francisco

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**TEXACO** White Plains, N.Y.

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## News Shorts

**Bank, CA resolve legal dispute**

**First Fidelity Bancorp.** has resolved its software licensing dispute with **Computer Associates International, Inc.** and agreed to a five-year, flat-fee perpetual license agreement. The MIPS-based license — targeted at mainframe systems software but including a handful of desktop products — permits First Fidelity to use CA software on any of its computers at any of its sites. Last April, CA filed a lawsuit against First Fidelity for breach of software license agreements and misappropriation of trade secrets for CA software that was managed for First Fidelity by Electronic Data Systems Corp. [CW, May 11, 1992].

**Bachman replaces president**

**Bachman Information Systems, Inc.** announced last week that Peter Boni, former president of Paramount Communications' software and information systems group, will replace Arnold Kraft as president and chief executive officer. Boni was previously president of On-Line Software International, Inc. Kraft, who had been Bachman's president and CEO since 1988, will remain at Bachman as a consultant.

**Panel clears Clipper encryption**

A panel of five experts from outside the federal government completed its review of the secret algorithm used in the government's proposed Clipper encryption chip, a controversial method for safeguarding communications while allowing the government to crack them in court-approved wiretaps. The panel said the algorithm is not likely to be breakable by "brute force" trial and error using any supercomputer available in the next 30 to 40 years. It added that while the algorithm must remain classified for national security reasons, the strength of the algorithm against attack does not depend on its secrecy.

**EDS widens its customer base**

**Electronic Data Systems Corp.** inked two megacontracts — one in its traditional mainframe outsourcing vein and the other as a "technology partner." The mainframe deal calls for EDS to take over processing for Nielsen Information Services. In contrast, a \$200 million, 10-year deal with IASD Health Services, which comprises Blue Cross/Blue Shield of Iowa and South Dakota Blue Cross, calls for EDS to re-engineer IASD's business processes and technologies.

**Mellon sells outsourcing units to Fiserv**

**Mellon Bank Corp.** took one giant step toward making its long-expected exit from the outsourcing business last week when it sold two business units to Milwaukee-based Fiserv, Inc. for \$70 million. The sale of Mellon's Financial Institution Outsourcing and Data-Link Systems, Inc. operations removes Mellon from the banking outsourcing business. Mellon retains what it calls its Commercial Outsourcing unit, which provides data processing to non-banking customers.

**SHORT TAKES** The Society for Information Management's software licensing task force will sponsor a summit between users and software vendors on Sept. 22 in Washington, D.C., which will coincide with the society's annual conference. . . . **Monsanto Co.** has begun installing a multisite document imaging system from **FileNet Corp.** The imaging application will be deployed in more than 30 of Monsanto's U.S. manufacturing and technical sites. . . . IBM's **Adstar** storage business introduced its Distributed Storage Manager software, a way to back up data from different vendors' PCs and local-area networks onto IBM mainframes.

More news shorts, page 16

# App delivery goes electronic

By Michael Vizard  
BOULDER, COLO.

The move toward widespread adoption of electronic software distribution received a major shot in the arm last week following IBM's announcement that it will bundle a compact disc containing a catalog of independent software applications with its low-end Ambra line of PCs.

At the same time, Gateway 2000, Inc. in North Sioux City, S.D., said it will distribute a free CD with 33 Microsoft Corp. applications to 25,000 Gateway customers who already have CD drives installed.

Both programs, which are based on technology from InfoNow Corp., located here, will allow users to browse for a package on a CD-ROM installed on a local server. They can then deploy that software by requesting an electronic key to be sent over a telephone line that unlocks the software on the CD.

For information systems directors, the advent of CD-based software distribution promises to low-

er one of the most significant costs associated with acquiring PC software: installation.

For example, Meta Group, Inc. in Westport, Conn., contends that a business with 1,000 PCs will spend about \$50,000 annually for the distribution of one bug fix, two application upgrades and one operating system upgrade. That estimate is based on a labor cost of \$40 per hour with an estimate of 20 minutes per PC upgrade.

"I know of some sites who won't buy some packages because it's just too difficult and expensive to install," said Carter J. Luscher, a program director at Gartner Group, Inc. in Stamford, Conn.

**On your mark...**

However, Luscher noted that the industry is just now coming to grips with the concept of electronic software distribution. "We're just starting the journey. Right now, we're about two steps from the starting line," he said.

One of the key technological challenges that still has to be over-

come is the fact that most electronic delivery vehicles do not have the ability to determine what types of software and hardware are installed at a user's desktop. So making sure that systems are correctly balanced still remains a labor-intensive process.

In addition, the licensing and metering technology that would allow IS directors to keep track of software use is also in its infancy.

But as these technologies mature, with IBM, Microsoft and Novell, Inc. all working on their own implementations, industry analysts say the role of value-added resellers (VAR) will diminish as end users begin ordering software directly from vendors in greater quantities.

"The smart [VARs] are saying that software has a limited future. That's why companies like Corporate Software are focusing on value-added services," Luscher said.

In fact, VARs are expected to begin using CD technology to start packaging applications aimed at specific vertical markets.

## IBM, Dell offerings have low-end emphasis

By Michael Fitzgerald

IBM and Dell Computer Corp. both went after cost-conscious buyers with vigor last week, introducing new systems with aggressive price points. Users, confronted by a general onslaught of technology, found it hard to generate much enthusiasm for the new products.

IBM unveiled Ambra Computer Corp., a U.S. company with the same name as an IBM subsidiary in Europe but with a completely different set of products and marketing approach than its European cousin, which was designed to target clone makers. Instead, Ambra U.S.A. aims at Gateway 2000, Inc., the North Sioux City, S.D., king of the mail-order hill.

Dell, meanwhile, went after Compaq Computer Corp., unleashing two product lines; it also took a potshot at Gateway with a new high-end model for its low-end Dimension line.

Analysts said IBM needed to create Ambra as a separate box to give itself credibility with buyers who like Gateway. They termed IBM's current efforts in the direct-market "half-hearted."

"IBM perceives, and accurately so, that people associate a premium with the IBM name, so [Ambra] says they don't have that premi-

um," said William Ablondi, an analyst at BIS Strategic Decisions in Norwell, Mass.

Ambra features IBM's first aggressive push to use Intel Corp.'s Pentium chip and marks the first time an IBM entity will use the Extended Industry Standard Architecture bus.

Ambra's high-end product is the TP662E/VL, which uses dual 60-MHz Pentium processors and costs \$6,559 for a box with 16M bytes of random-access memory and a 540M-byte hard drive. The line starts at \$809 for a 486SLC2-based media-less box.

**Color offerings**

Ambra's product family also includes two color notebooks: a dual-scan passive-matrix model with a 120M-byte hard drive that costs \$2,449; and a thin-film transistor active-matrix unit priced at \$3,449 with the same configuration.

Ambra employs roughly 60 people and has outsourced production and telemarketing.

Dell, meanwhile, unveiled two lines, OptiPlex and NetPlex, and beefed up its low-end Dimension line. The three lines reflect a market study designed to link Dell's product moves to one of five customer types: those on corporate

networks; those in mission-critical environments; those at small and medium-size companies who want bundled offerings; and power and novice users.

OptiPlex serves effectively as a replacement for the L and M product lines announced last December. The machine has a base price of \$1,399 and uses processors ranging from a 25-MHz 486SX to a 33/66-MHz 486DX. A high-end OptiPlex with 16M bytes of RAM and a 450M-byte hard drive will cost \$3,749.

NetPlex is targeted at Compaq's ProLinea low-end line and comes with a preinstalled network adapter card. Its base price is \$1,099. The new Dell Dimension XPS family targets Gateway with a 466V model that has 16M bytes of RAM, a 450M-byte hard drive, a Diamond Viper video card and a Creative Labs, Inc. Sound Blaster for \$3,365.

One potential customer for both Ambra and Dell summed up the differences in perception that each will face.

"Ambra sounds OK, but we'll see; we're more interested in ValuePoints. As for the new Dells, they seem well-engineered, if not terribly revolutionary, and we're interested in them," said John Woods, PC systems specialist at Chevron Information Technology Co., Chevron USA, Inc.'s information systems unit in San Ramon, Calif.

Chevron buys PCs from a multitude of vendors, Dell and Gateway prominent among them.

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# COSE attacks net administration

By Elisabeth Horwitt

**■ The COSE alliance of leading Unix vendors hopes within about six months to equip its common desktop environment with systems administration tools similar to what Microsoft Corp. provides for its Windows and Windows NT products.**

The group is working on both a standardized framework and services for administering distributed Unix systems with the same ease that Microsoft claims users will be able to administer NT via Microsoft's Hermes, said Larry Robinson, an OpenView product marketing manager at Hewlett-Packard Co. and a participant in the COSE systems management group. The utilities will be included in the various Unix flavors that COSE vendors supply.

Such a development is key to the Common Operating System Environment (COSE) consortium's goal of providing a standardized Unix platform that can win out over NT as the centerpiece of corporate users' client/server strategies, according to Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass.

However, some analysts said they believe some of COSE's working groups, including the one on systems management, will not achieve consensus and may "fade away" because vendors will not be able to reach agreement on standards.

Neal Hill, a senior analyst at Forrester Research, Inc., takes a different view. "COSE is a way to arbitrate differences quickly. Because of the delay of [OSF's] DME, my suspicion is that what IBM and HP expect to do is to take [IBM's] NetView and [HP's] OpenView, mix them up together and throw them on the table. That would produce a widely supported system management specification that works and that already has tangible products based on parts of it."

## Top priority

Indeed, the ability to manage distributed client/server systems with the same coordinated ease that a mainframe environment provides is a top priority for many downsizing corporations. "The tools available today for managing mis-

sion-critical applications" on distributed systems "are woefully inadequate," said David Sheppard, chief executive officer at Fleet Services Corp. in Providence, R.I.

COSE, which was formed earlier this year by HP, IBM, Unix System Laboratories, Inc., Sun Microsystems, Inc. and The Santa Cruz Operation, recently released the first version of a common Unix-based desktop environment that aims to provide users with a common look and feel and programming environment across the various vendors' flavors of Unix. Working specifications for the environment are due out by year's end, with products likely to appear in 1994, Robinson said.

The COSE group hopes to do Microsoft one better by enabling Unix systems to manage a variety of desktop environments, Robinson said. Hermes was designed to administer Microsoft's own Windows and NT systems.

A more long-term and far more ambitious project for the group is to come up with a common framework for managing distributed, heterogeneous client/server systems based on COSE, Robinson said. Such a framework is a high priority for companies such as Fleet, which needs a way to integrate the "various, fragmented tools" that vendors are bringing out, Sheppard said. The bank now has Unix and is probably going to implement NT, "so probably no one vendor will solve" its system administration needs, he added.

The COSE group is evaluating components of the Distributed Management Environment (DME) for potential inclusion in its specifications, Robinson said. However, the group has apparently decided to come up with its own systems administration standard because the Open Software Foundation (OSF) is taking so long to make DME into a viable product, Hurwitz said.

The group is likely to adopt an object-oriented framework based on the Object Management Group's Common Object Request Broker Architecture (CORBA) as a way to interconnect managing and managed systems, Morrison said. The OSF has announced plans to incorporate CORBA into DME.

COSE also plans to develop a set of services that will run on the framework.



# Novell, Stac tighten ties

By Michael Fitzgerald  
PROVO, UTAH

Novell, Inc. last week said it will build compression technology into all its future operating systems, creating the promise of widened data paths.

Novell's first step down that road was a deal to integrate Stac Electronics, Inc.'s Stacker compression software into Novell DOS 7.0. As part of the deal, the two companies will work together to build San Jose, Calif.-based Stac's LZS Compression algorithm into Novell's NetWare and UnixWare system software, but no target dates were announced.

Under the nonexclusive licensing arrangement, the two companies plan to develop methods to give users double the storage on their existing machines and as much as double the data path across their networks.

## Decompression drawbacks

While Novell already has built compression capabilities into NetWare 4.0, that compression approach is oriented toward archiving and does not allow for dynamic decompression of files, according to Stac officials.

"What we announced was the first piece, the client side. The two remaining pieces are storage on the server, using our standardized algorithm, and then the third piece, which doesn't yet exist, is compression over the wire," said Gary Clow, Stac's president and chief executive officer.

Most users contacted said they thought the idea of compression over a local-area network seemed like a good one, if the technology could be trusted.

# Novell pumps up enterprise

CONTINUED FROM COVER 1

nology at Boston Edison Co., said, "Novell's Unix direction is crucial to us" because it provides a scalable platform that can support new applications, particularly in the customer support area.

Novell plans to strengthen the integration between UnixWare and NetWare gradually during the next two to three years. Currently, UnixWare clients can access NetWare servers and vice versa. The rollout will for the first time extend to UnixWare basic integrated NetWare services, including authentication, network and systems management and directory services, a Novell spokesman said.

The company also plans to migrate Tuxedo, the Unix-based development environment, to NetWare by the end of next year, said Michael DeFazio, senior vice president of Unix System V. That would enable users to build NetWare applications that can access Tuxedo-compliant services on Unix and on IBM hosts via Tuxedo's CICS com-

ponent, DeFazio said.

Another key goal of the rollout is to move NetWare from its current status as an isolated bindery-oriented server to a more enterprise-oriented system. This effort would build on what has been done with directory services to date with 4.0.

## Services lineup

These efforts will create a new generation of NetWare Application Services, including the following:

► Work-flow management, which will enable the NetWare server to act as a directory server and router for documents generated by Novell and third-party messaging systems.

► A software distribution system based on NetWare Navigator that will provide centralized software

distribution to NetWare 3.X and 4.X systems, due in the fall.

► A NetWare video server that will allow NetWare servers to deliver full-motion video to Windows clients over the local-area network. It is due out by year's end.

Novell intends to provide client systems with transparent access to the application services via NetWare 4.0's NetWare Directory Service, an object request broker within its AppWare framework. The directory will be extended to UnixWare at an undisclosed time.

Novell also plans to provide NetWare for Unix, which will allow users to run NetWare Loadable Modules and Unix applications concurrently on the same system.

This is similar to the NetWare for OS/2 product co-announced with IBM last week, which allows users to run OS/2 2.1 applications and NetWare 4.01 services on the same system.

## Big piece of the pie

NetWare sales made up 82% of Novell's total business in 1991, with the remainder made up of IBM links, hubs, routers, network management, client systems, education and support.

# All in the network

Novell plans to eventually provide integrated network and systems management across NetWare- and Unix-based client/server environments.

However, this is a long-range strategy that involves gradually moving core network management services off the current NetWare Management System (NMS) Windows 3.0 platform and onto NetWare, said Steve Dauber, product line manager for network management products.

The Windows 3.0 console would continue to provide a graphical user interface for viewing network management data, configurations and activities. The goal is to have multiple domains, each managing a different type of network device or installation, that could access one another's data and correlate management, Dauber said. No time frame was given.

Novell took a step toward a more enterprisewide network management system when it released NMS Software Development Kit 2.0. It includes agents for managing NetWare from any Simple Network Management Protocol platform, Dauber said.

Also in the works is a distributed version of Novell's LANalyzer that will comply with the Remote Network Monitoring LAN diagnostic standard and feed a wide variety of data about local-area network systems to NMS, Dauber said. It is expected at Interop.

—Elisabeth Horwitt

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## IBM to add to Information Warehouse

CONTINUED FROM COVER 1

while the Locator is a nice idea, "unless it goes across diverse platforms, it doesn't do me any good."

Similarly, Bill Inmon, a data warehouse consultant associated with software vendor Prism Solutions, Inc. in Sunnyvale, Calif., said, "If you don't support

multiple vendors and multiple technologies, then you don't have a viable product." He added that, based on his contacts with customers installing a warehouse, very few choose IBM platforms for it.

Arnold responded that the Locator's operating environment requirements "do not seem to be an inhibitor" to users

whom the company has talked to so far. Nevertheless, he said, "We're looking at other platforms, and we'll continue to pursue that where it makes sense."

Not everyone agreed it is a large drawback. "I don't see it as a major hit," said John Mann, senior analyst at The Yankee Group in Boston. "You can put the Locator on an OS/2 server somewhere, and one server can support quite a few users."

More important, Mann said, IBM will fi-

nally allow customers to move data around the network. "IBM is recognizing the reality of customers' environments. They're doing the inevitable."

Susan Ostervelt, a corporate data administrator at Storage Technology Corp. in Louisville, Colo., and an early warehouse adopter, said she is very interested in the Locator. "We've been dealing with it manually, on paper. Most of the products that exist are too technical for end users, so yes, it appeals."

Robert Holland, president of Holland Systems Corp., a consulting firm in Ann Arbor, Mich., said the Locator concept is a good idea but does not replace the time and energy required to standardize the data and build the basic warehouse architecture. "What good does the key to a car do you if you don't have a car?" he asked.

# "Wow, that's what I call pushing the boundaries..."



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## Parallel box draws near

IBM is essentially on schedule with its Enterprise System/9000 parallel processor announcement set for later this year, a company executive said last week. But the unveiling will likely take place in October—or even later.

The machine, intended to handle complex database queries and off-load that work from the regular mainframe, will be able to link as many as 50 processors in its first go-round [CW, Jan. 18]. It will connect to a traditional ES/9000 via Sysplex, IBM's fiber-optic channel extender.

But the timing of the announcement is off IBM's usual second-Tuesday-in-September schedule. IBM is working with a few customers to get the major bugs out before announcing the system. General availability is scheduled for soon thereafter, said Bill Reedy, director of market operations at IBM's Enterprise Systems line of business.

—Johanna Ambrosio

## Corrections

•Because of a reporting error in the Aug. 2 issue, the version of Windows NT that BankAmerica Corp. is running was misidentified. The bank is running the standard edition of NT.

•Because of a reporting error in the Aug. 2 issue, the company for which Liz Barnett works was misidentified. Barnett is an analyst at New Science Associates, Inc. in Westport, Conn.

•Because of an editing error, T. J. Rodgers' name was misspelled in the Aug. 2 issue.

•Due to a reporting error in the Aug. 2 issue, John Lochoy's duties were incorrectly detailed at CNA Financial Corp. He runs the IS division, not the IS department.

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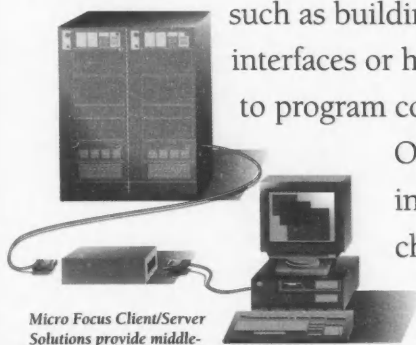
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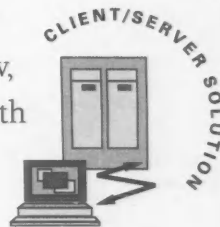
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## Reporter's

## Notebook

Michael Braun, the new chief executive officer of Kaleida Labs, Inc., was patrolling the MacWorld halls, perusing the multimedia competition and talking up his new role. Braun said he is "considerably more of a hands-on manager" than venture capitalist Nat Goldhaber, who resigned last month as CEO but who remains co-chairman. Analysts said the shift occurred because Kaleida's ScriptX cross-platform scripting language needs to be kicked into high gear. ScriptX is now in a prealpha phase. Look for an alpha version in the fourth quarter and a beta-test version in the first half of 1994. The first two platforms will be Macintosh and Windows, followed closely by OS/2.



Sharp Electronics jumped on the Apple Newton bandwagon last week, unveiling the PI-7000 Expert Pad, the first licensed personal digital assistant based on the Newton Intelligence operating system. Priced at \$399, the PI-7000 recognizes graphic patterns as well as cursive script, block letters or a mixture of both and "gesture commands." Sharp said it can learn the user's handwriting and work habits.

The Newton has finally been announced, but the hype machine just will not quit. This November, Beyond Words Publishing will publish *Defying Gravity: The Making of the Newton*. Because Apple has given the book its stamp of approval, it is questionable how much dirt will actually be dished in the new volume.

Apple last week announced its fifth round of price cuts in two months. It sliced price tags on its high-end computers by up to a third.

Apple also announced the PlainTalk Text-to-Speech developers tool kit, which can be used to create Macintosh-based applications that convert typed text to spoken English. It is slated to be available next month.

BellSouth's Mobile-Comm unit signed on to provide wireless messaging services for Newton users through its paging network starting this fall. Apple has also contracted with Sprint and BT North America to develop future Newton products with features ranging from banking to booking travel tickets.

More than 20 software developers unwrapped software for the MessagePad, from specialized realtor systems to titles for sports enthusiasts. Strangely missing from the ranks of those announcing any upcoming MessagePad release: longtime Apple supporter Microsoft.

# Apple pitches Newton to corporate users

By James Daly  
BOSTON

Tens of thousands of Macintosh fans braved the heat, the crowds and the overcooked chowder at last week's MacWorld Exposition to hear Apple Computer, Inc. make its corporate pitch for the Newton MessagePad.

Apple's primary goal at this early stage in Newton's life cycle is to make sure big business sees the handheld electronic organizer as something more than a Game Boy on steroids.

Analysts also noted that Apple must be able to provide an adequate supply and selection of communications products and application development tools to accompany Newton, while developing quicker and more accurate handwriting recognition. Although Apple is hyping MessagePad for its "anytime, anywhere" capabilities, its communications capabilities will be limited until the end of the year, according to company officials.

In its initial form, the MessagePad's built-in functions will include LocalTalk for Printing and communications with Macintoshes as well as a 9.6K

bit/sec. infrared system to beam data to other Newtons. A Personal Computer Memory Card International Association slot will also offer options for future communications products.

Apple was able to pull a rabbit out of its hat at the product's splashy introduction by trotting out several major companies that are considering projects that will use the MessagePad.

Most of the MessagePad tire kickers said they see the device as a way to quickly manage and communicate information between their central office systems and the point of contact with the customer.

The U.S. Department of Defense, for instance, is working with Apple and systems integrator KPMG Peat Marwick to apply the MessagePad to its health care operations. Final contract negotiations are under way for a project called ProMed, said Col. Fred Goring, a project manager at the U.S. Army Medical Material Agency.

"The health care environment is a highly dynamic workplace, so we are excited about the promise of untethered communications," he said.

ProMed will allow physicians imme-

diate access to critical care data such as medical history, test results, patient records and problem lists.

American Express Co. is also working with Apple to develop customized applications for card members who use the MessagePad, said John I. Williams Jr., senior vice president at American Express Travel Related Services Co. Williams was short on specifics but said American Express "is working to develop customized applications for the business traveler and American Express Card members."

Likewise, Ira Tolmich, The Coca-Cola Co.'s director of information technology, said the soft drink maker plans to integrate the MessagePad into its work-flow model.

Gaston Bastiaens, general manager of Apple's Personal Interactive Electronics Division, said corporate interest in developing applications for MessagePad is already high. According to the company, more than 1,500 developers have expressed interest in developing applications for the Newton family.

Jeffrey Henning at BIS Strategic Decisions in Norwell, Mass., said he was impressed with the developer curiosity. "That's a huge number of interested parties for a device with an installed base of zero," he recently wrote.

MACWORLD  
EXPOSITION

## FCC widens options

CONTINUED FROM COVER 1

in Washington, D.C., who represents telecom users in the financial services industry. This is because switched services are used by firms with lighter traffic loads that do not justify dedicated-line price tags.

But the ruling should also touch large companies looking for alternative local access for their smaller sites, Levine said.

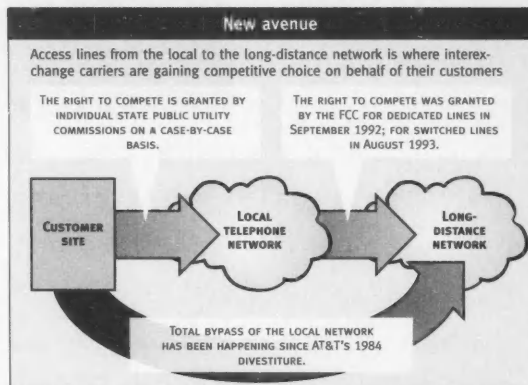
A possible downside of letting more carriers into the network chain is that it could "create more points of failure and concern," said Jerry Noble, director of telecommunications at the American Cancer Society in Austin, Texas. He said the finger-pointing among carriers when there is a network problem is already "a nightmare. You may trade off cost savings at the back end in terms of management headaches."

Although generally it is a customer's long-distance provider—not the user—that chooses who will carry the traffic between the local central office and the long-distance network, the continued erosion of the local phone company's monopoly should bring the cost savings and better service that traditionally accompany competition, users and analysts said.

"Our experience has been that this kind of activity has always resulted in lower costs," said Bob Michna, vice president of telecommunications at Aetna Life & Casualty Co. in Hartford, Conn. However, other users said the cost impact depends on interexchange carriers passing savings on to their customers.

"While we could benefit from lower costs... I'd have to see it to believe it," Noble said.

AT&T spokesman Andrew Myers said users "can pretty much bank on our passing the rates



along." But he acknowledged that AT&T has a bias toward Bell operating company services.

But "the smart user will see to it that the long-distance carrier chooses the cheapest or better access company," said Brian Moir, public policy counsel to the International Communications Association user group and a partner at Fisher, Wayland, Cooper and Leader, a law firm in Washington, D.C.

Chris Finn, a senior analyst at telecommunications consultancy TeleChoice, Inc. in Verona, N.J., predicted the ruling will not benefit most businesses for three to five years. "Interconnection... using switched services is technologically more complex than providing private lines," he explained.

Nonetheless, the FCC action "signals that the local-exchange monopoly is going to be dismantled, and sooner than most people thought," said Royce Holland, president of alternative access giant MFS Communications.

### Bells don't think caps

Competition is forcing the Bell companies to get creative, said attorney Henry Levine. They are beginning to write package deals resembling AT&T's Tariff 12 contracts, which provide large users with customized, discounted voice and data services. Last week's ruling could pressure the telcos to offer more such deals at better prices.



*"If interoperability was just  
about connecting data with  
applications, implementing  
enterprise client/server would  
be easy. It's getting them to  
work together without losing  
performance or functionality  
that keeps you up at night. And  
to solve it, you have to..."*



Mark Page knows the situation well. Vice President of Connectivity Products at Sybase, he's helped a long list of customers develop integrated solutions to one of the most significant problems in client/server computing. He shares that experience in a taped conversation *"Making Connections In Client/Server Computing."* For your copy, call 1-800-SYBASE-1.

# Computerized records: An open book

CONTINUED FROM COVER 1

Not just the usual cadre of privacy advocates is concerned. A major study by the prestigious Institute of Medicine in Washington, D.C., strongly backed computer-based medical records but said the privacy issue, not technology, is the No. 1 barrier.

"All that automation won't do a damn bit of good if people don't trust the system and then reform fails due to a lack of participation," said one member of the administration's health care reform task force, who requested anonymity.

No details were available yet, but the Clinton plan is expected to call for a nationwide network of computerized medical records. Instead of a monolithic database, the plan is to link the various electronic records in medical facilities and regional health alliances across the country into a very distributed database.

Every American will get a unique patient identification number, which will be the key that unlocks and consolidates the scattered electronic files for that patient. "You need a unique identifier so that when you go into an emergency room in Sheboygan [Wis.] but you live in Omaha, your information can be obtained," the task force member said.

One major controversy is whether that patient identifier should be the Social Security number or should be based on a different numbering system. The Social Security number has a practical advantage because most people already have one and know it, but a coalition of privacy advocates recently wrote a letter urging the Clinton task force not to adopt its use.

## Unprotected password

The problem, Rotenberg said, is that the Social Security number is widely used as the identification number for tax, employment, credit and motor vehicle records already, so applying it to medical records would make it easy to merge all of those records into a Big Brother dossier. "The Social Security number is like a password to other files," he said.

Use of Social Security numbers is so widespread that it is easy for hackers to get them and access medical systems, privacy advocates said. Furthermore, it may be

## Taking charge

\*Congress' Office of Technology Assessment will release a study on medical information privacy early next month.

\*Equifax, Inc. is sponsoring a national opinion poll on the privacy of medical records. Results are expected in October.

\*U.S. Rep. Gary A. Condit (D-Calif.) has convened a task force to draft medical privacy language for attachment to the big health care reform bill.

\*U.S. Sen. Christopher Bond (R-Mo.) is preparing to introduce a bill that would set privacy standards for the exchange of medical data.

hard to keep records straight because some people have duplicate numbers, others share a family number, and the Social Security number lacks a "check digit" to verify keypunching accuracy.

The Clinton task force had originally settled on using the number but has recently begun leaning away from it because of the privacy controversy, according to Peter Waegemann, executive director of the Medical Records Institute in Newton, Mass.

Whatever numbering scheme is used may be less important than passing federal legislation that establishes the ground rules (and penalties) for disclosure of medical records, said longtime privacy expert Alan F. Westin, professor of public law and government at Columbia University in New York.

"State law [on medical privacy]

is extraordinarily diverse and, in many cases, antiquated. We're moving toward regional information systems and national exchange of [medical] information, so the time is right to enact broad federal legislation," Westin said.

U.S. Rep. Gary A. Condit (D-Calif.), chairman of a House subcommittee that deals with information privacy, is currently drafting privacy language to ride on the coattails of health care reform legislation.

"There is too much interstate transfer of patient information to continue to rely on differing state confidentiality laws," Condit said.

"For example, which law applies to the record of a patient who lives in Maryland, has a doctor in Virginia, a hospital in the District of Columbia, an employer with headquarters in California and an insurer in Connecticut?"



**Marc Rotenberg:** Big Brother-like connotations

## Patient control

The Chicago-based American Health Information Management Association (AHIMA) has drafted a bill that would generally prohibit the disclosure of medical records unless the patient signs a narrowly defined authorization form. It would state a specific purpose, recipient and time limit for the disclosure.

"The problem now is that insurance companies require you to sign an open-ended, blanket authorization that allows

them to access all of your medical records at any time," said Kathleen A. Frawley, director of the AHIMA's Washington, D.C., office.

Of course, it is possible that electronic patient records could be more confidential than paper records if strict security controls are implemented from the start.

For example, multilevel access controls could allow clerks to see only administrative data, not the whole medical file, and audit trails could identify users who have "peeked" at certain screens, noted Pamela Wear, executive director of the AHIMA.

A few medical facilities across the country already have electronic patient records and work hard to safeguard privacy, according to Wear, but the security of the nationwide network will only be as good as its weakest site. "That's why we want to set a high national standard," she said.

## No zone of privacy

"And whatsoever I shall see or hear in the course of my profession... I will never divulge, holding such things to be holy secrets."

—Hippocratic oath

When Dr. Donald Miller closed his family practice in Taylors, S.C., in 1991, he had to do something with his 10,000 patient records. So he auctioned them off to the highest bidder, an auto junkyard dealer, for \$4,000.

The dealer sold photocopies to some former patients for \$25 each. Eventually, he resold the records for \$6,000 to a doctor moving into town.

Most Americans would be shocked to learn just how little medical privacy they have today, despite claims of doctor/patient confidentiality, privacy experts said.

For example, little-known Medical Information Bureau, Inc. in Westwood, Mass., compiles a database of medical records on about 15 million people, which insurance firms use to identify high-risk applicants and fight insurance fraud.

Privacy advocates also worry about the following recent developments:

- Some hospitals hold free health clinics (such as blood-pressure screening) in the community and create a database of participants for use in targeted marketing campaigns.

- Many doctors and pharmacists allow market research firms to scan their computerized records to compile market share information for drug companies.

- A mailing list company reportedly has compiled a list that includes 3.5 million arthritics, 2.7 million hypertensives, 1 million diabetics and 1 million ulcer sufferers.
- The Ohio Supreme Court ruled last year that a local police department's use of a computer program to collect drug prescription information from area pharmacists does not violate a consumer's right to privacy.

According to a 1992 congressional report, more genetic testing will increase the dangers of uncontrolled medical disclosure.

—Mitch Betts

## Electronic shock

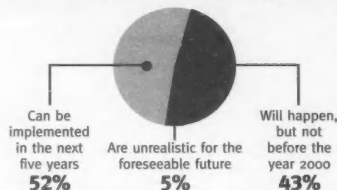
IS executives in health care say electronic medical records are one of their top priorities...

### TOP ISSUE PRIORITIES

- Integrating existing systems to share information across departments.
- Increasing the use of computers by physicians and nurses.
- Implementing the computer-based physician record.
- Establishing remote links to physician offices, clinics, HMOs, etc.

... and more than half say that electronic medical records will be a reality within five years.

### COMPUTERIZED PATIENT RECORDS:



Source: Hewlett-Packard Co. and Healthcare Information and Management Systems Society survey of 571 health care IS professionals

## Discomforting history

The nation's experience thus far with two of the country's largest electronic record systems—the national credit bureaus and the National Crime Information Center (NCIC)—is not comforting, observed Rep. Gary A. Condit at a recent congressional hearing.

Credit bureaus have been roundly criticized by consumers and regulators for accuracy problems and breaches of confidentiality. Likewise, there has been a variety of misuses of NCIC data, including cases in which police officers have been indicted for selling criminal histories gleaned from the NCIC.

After studying 62 examples of NCIC records abuse, the U.S. General Accounting Office last month urged Congress to enact strong criminal sanctions. "How will we be able to protect health records in a computerized environment," Condit asked, "if we can't adequately protect criminal history records or credit records?"

—Mitch Betts

# IRS uncovers bogus access to tax records

By Gary H. Anthes  
WASHINGTON, D.C.

Ongoing efforts to modernize systems at the Internal Revenue Service have had unforeseen consequences: unauthorized access to confidential data.

According to an IRS investigative report released last week by Sen. John Glenn (D-Ohio), 368 employees exploited "ineffective security controls" to snoop through the computerized tax accounts of friends, relatives, neighbors and celebrities at the IRS' Atlanta office. Glenn said five employees had used the system to engineer fraudulent returns, including one person who triggered some 200 false tax refunds.

Early investigations in other IRS regions have turned up another 100 people suspected of unauthorized access to taxpayer information, Glenn said.

## A taxing situation

In fiscal 1992, the IRS:

- Processed 204 million tax returns, 11 million of them filed electronically.
- Processed 1 billion documents (W-2s, 1099s, etc.).
- Handled 1.7 billion pieces of paper.
- Collected \$1.12 trillion in taxes.
- Issued 89 million refunds totaling \$13 billion.
- Maintained 600 offices to assist taxpayers.

Source: U.S. General Accounting Office  
Fiscal year 1992 financial audit.

"The IRS is the agency Americans fear most," said Sen. David Pryor (D-Ark.), who sits on the Government Affairs Committee, which held a hearing last week on the IRS. "This confirms their worst fears."

Glenn said he was especially troubled that the IRS' investigation had focused on just one of seven regions and just one of 56 ways the database system can be accessed by IRS employees. "I'm concerned this is just the tip of a very large iceberg," he said.

Problems with controls in IRS computer systems are not new. Last September, the U.S. General Accounting Office raised concerns about privacy and security in the architecture plan for the Tax Systems Modernization, a 10-year, \$8 billion effort. It is the third attempt in 25 years to overhaul systems at the IRS.

Indeed, the IRS investigative report published last week said an enhancement to the existing system to support Tax Systems Modernization "greatly in-

creases the risk of employee browsing, disclosure and fraud" by making more data accessible to more people.

Margaret Milner Richardson, commissioner of internal revenue, said the misused system is 20 years old and is used by 56,000 employees. She said it has nearly all the security features required by federal standards for such systems,

including passwords and user profiles that limit types of access based on user job descriptions. She said the IRS has taken steps to put greater management emphasis on security and privacy.

Deputy Commissioner Michael P. Dolan said the IRS' Atlanta operation discovered the illegal activity by using software able to detect suspicious use

patterns over three years from a database of audit trail information. He said widespread use of the detection technique has been inhibited by the difficulty of processing tape archives, which grow by 100 million transactions per month.

However, Dolan said, each regional IRS center will soon get the "pattern detection" software with high-capacity optical disc hardware to allow line managers to easily monitor system use — and possible misuse — by their employees.

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## News Shorts

**Wang details coming-out plans**

Wang Laboratories, Inc. appears to be on its way to emerging from Chapter 11 bankruptcy protection next month. A U.S. Bankruptcy Court judge in Boston last week approved the disclosure statement filed by Wang as part of its reorganization plan and scheduled a Sept. 20 confirmation hearing on the plan as a whole. The plan will now go out to the company's creditors and stockholders for balloting. Wang also signed an agreement in principle for a \$60 million private stock sale with Steinhardt Management Co. in New York.

**BT, MCI progress on global deal**

MCI Communications Corp. and BT said last week they have worked out the details of their global partnership, announced in June, which includes a \$4.3 billion BT investment in MCI for 20% ownership. The agreements include the appointment of Chris Earnshaw, BT's managing director of worldwide networks, as chief executive of the BT/MCI worldwide joint venture for telecommunications services. The companies also decided the new company's headquarters would be in Northern Virginia.

**Cisco yields to quasi-IBM net scheme**

Cisco Systems, Inc. said last week it will support a "standards-based" version of IBM's Data Link Switching (DLSW) — under construction by an IBM developers' working group — on its routers in mid-1994. DLSW is IBM's method of encapsulating inherently nonroutable Systems Network Architecture protocols in Transmission Control Protocol/Internet Protocol packets.

**Smart cards, unite!**

Representatives of the financial services, telecommunications, entertainment, publishing, computer and health care industries have joined with government agencies to form the Smart Card Forum to address compatibility issues of smart card technologies across industries. Participants include American Express Co., Citibank NA, Apple Computer, Inc., IBM, Bell Atlantic Corp. and Mastercard International, Inc.

**New subnotebooks from Gateway**

Gateway 2000, Inc. will today release an Intel Corp. i486-based version of its Handbook subnotebook and a 1.8-in.-thick color notebook family called ColorBook. The 2.9-pound Handbook will now come with either a 25-MHz 486SX for \$1,495 or a new 20-MHz/40-MHz DX2 for \$1,995, with a 130M-byte hard drive. The ColorBooks weigh 5.7 pounds and have a 9.4-in., dual-scan, passive-matrix color screen, a built-in trackball and a Personal Computer Memory Card International Association Type III slot. Using nickel-metal hydride batteries, Gateway promises two to four hours of battery life. A 486SX/25 with an 80M-byte hard drive costs \$1,995. A top-of-the-line 486DX/33 with a 170M-byte hard drive will cost \$2,595.

**SHORT TAKES Sterling Software, Inc.** reported third-quarter sales of \$7.4 million, up 11% over last year's third-quarter results. . . **Nordstrom, Inc.**, a \$3.4 billion fashion specialty retailer in Seattle, has signed a \$4 million contract to install NCR Corp. System 3000 servers and workstations for customer service and inventory management. . . **System Software Associates, Inc.** last week acquired Elke Corp., a Plymouth, Minn., maker of maintenance management and tracking software for IBM's Application System/400 computers.

# Unisys, Intel take parallel road

Joint venture seeks boxes more powerful than mainframes

By Thomas Hoffman  
SAN FRANCISCO

Seeking to leverage each other's strengths, Intel Corp. and Unisys Corp. last week said they are jointly developing a scalable parallel processing system for commercial use. The first beta-test systems are expected sometime next year.

Early reports have indicated that scalable parallel processing systems are far less expensive and more powerful than mainframes.

Under the agreement, Intel will supply its Pentium microprocessors and scalable parallel processing mesh interconnect subsystem. The subsystem, currently used with Intel's i860-based Paragon supercomputers, was designed to provide high-speed communications between nodes.

Unisys, meanwhile, will provide a microkernel-based implementation of Unix System V Release 4 and other applications software. Nick Derchak, a vice president in the Unix systems group at Unisys, said Unisys will market the systems but added that the firms are still working out cross-licensing issues.

Still, the parallel systems, which are not expected to debut until 1995, will have to overcome some major obstacles, most notably the ability to "parallelize" existing applications in a way that is transparent to end users.

"The whole software picture is

the home of the biggest technical challenges," said David Frankel, a director of technology at Smaby Group, Inc., a Minneapolis-based market research firm. Frankel and other analysts said the compiler technology required to parallelize existing mainframe and other ap-

plication language Mapper and LINC application development tools. These systems will be designed to "decompose" large macro functions across nodes, Derchak said.

"We think a number of functions can be improved without fiddling with the compiler technologies," he said.

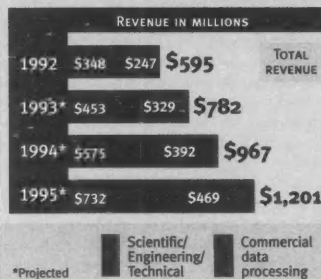
Unisys customers said they liked the development effort but offered mixed views on how rapidly their organizations plan to deploy parallel processing systems. George F. Thomas, senior vice president and director of information systems at New York Clearing House, said his firm would likely implement one of the forthcoming parallel systems as long as they would run applications under MCP/AS, Unisys' proprietary operating system for its Model A19 mainframe.

Still, Thomas expressed caution on parallel processing. "We wouldn't jump on any new hardware or software venture until it's proven, which would probably be around the year 2000."

Though Unix will be the core operating environment for the scalable systems, Bell said the vendor is developing communications mechanisms to link the parallel systems with its customers' A series and 2200 series mainframes. Derchak said the new systems will complement, not compete with, Unisys' parallel processing initiatives for its 2200 boxes.

## Parallel projections

Corporate America is projected to slowly gravitate to parallel processing during the next few years



Source: Smaby Group, Inc., Minneapolis

plications is not yet available.

Unisys executives downplayed those criticisms and said the company plans to attack parallel software development in other ways. For example, the mesh interconnect subsystem will include Unix microkernel message passing technologies from Chorus Systems, Inc. designed to provide a "single-system view rather than a multiple-processor view" of applications, according to Ron Bell, Unisys' chief technology officer.

In addition, Unisys is developing parallel versions of its fourth-gen-

## Safety in numbers

**T**he Big Three auto makers have teamed up with five national laboratories to develop application software for massively parallel computers featuring hundreds or thousands of processors.

General Motors Corp., Ford Motor Corp. and Chrysler Corp. will develop supercomputer applications that they hope will greatly reduce the amount of time — often measured in months — needed to construct, run and evaluate computer simulations for the next generation of cars.

For years, the U.S. automobile industry has used the traditional "vector" supercomputers made by Cray Research, Inc., but running a single crash simulation on even the largest vector machine can take hours.

"If we could do the same thing in minutes, it would mean a whole change in the way we design cars," said George Dodd, head of the analytic process department at GM.

Dodd said the consortium will not port existing Cray codes — in areas such as computational fluid

dynamics and structural mechanics — to the massively parallel machines; it will design and code them from scratch, concentrating on developing algorithms that lend themselves to parallel processing.

Dodd acknowledged a body of opinion that says the use of massively parallel computers is greatly restricted because they are difficult to program and because of their inherent unsuitability for serial types of problems. "We want to spend a couple of years exploring how far we can go," he said. "We will probably find some areas where they make a lot of sense and some where they don't at all."

Dodd said the Big Three will enjoy proprietary rights to all code developed jointly with the laboratories for five years.

The laboratories of the U.S. Department of Energy, which have been seeking ways to move away from their roles as developers of nuclear weapons, will pony up \$6 million to \$7 million for the project over three years; the auto makers will give a similar amount, Dodd said. — Gary H. Anderson

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**HEWLETT  
PACKARD**

# New tools debug client/server apps

By Melinda-Carol Ballou

Corporate developers of client/server applications are finding that testing distributed applications is dramatically more complicated than debugging host-based programs. This stems from the need to manage a much greater range of variables.

Developers at Norwest Mortgage, a national mortgage company in Des Moines, Iowa, and Delta Airlines in Atlanta recently overcame client/server testing woes by using tools that help streamline and automate the process. But challenges remain.

These include integrating a multiplicity of hardware architectures and appli-

cations and working around unstable desktop environments that do not offer support for multitasking, such as Windows and Novell, Inc.'s NetWare.

At Norwest Mortgage, senior quality analyst Joan Woodward spearheaded testing for a client/server mortgage processing application that was brought up last week on some 400-plus Windows-

based desktops. The task was made easier by testing tools from Software Quality Automation, Inc. (SQA) in Woburn, Mass.

With the SQA tools, which use Microsoft Corp.'s Visual Basic as a scripting language, Woodward's team was able to create the appropriate tests in a 10-day period and run regression tests daily for the next 15 days. "Before, it would take us 10 days to perform one test manually. With the tools, we can stack the tests and run them in batch at night," she said.

Bill Elder, project manager at Delta, chose the SQA tools to handle object-based graphical user interface (GUI) development and testing for a client/server reservation system that will go out to 30 test users later this month.

"We wanted to come up with a test plan and reuse it," he said.

Among the factors that make client/server development so complex and applications so difficult to test are the management of GUIs and the integration

of code developed in the U.S. at IS shops, on average there are about 10 bugs; for comparable development in Japan, the average is 0.2 bugs. Commercial U.S. developers average 0.4 bugs per 10,000 lines of code.

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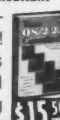
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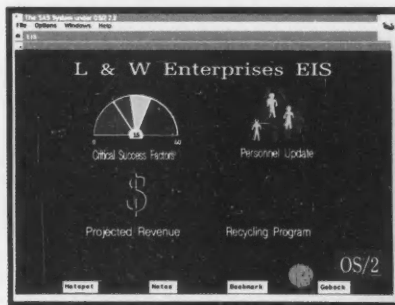
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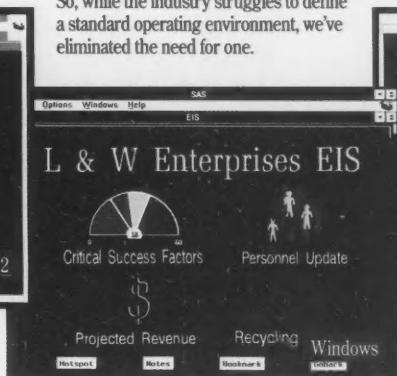
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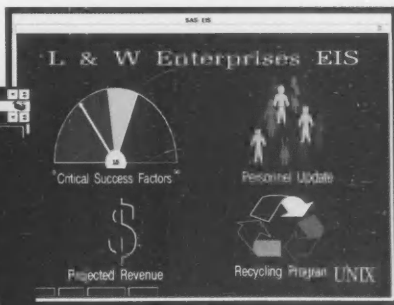


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# Cross-regional ATM service debuts

By Joanie M. Wexler  
SAN JOSE, CALIF.

The first carrier to offer Asynchronous Transfer Mode (ATM) network services stepped up to the plate last week when MFS Datanet, Inc. revealed it already has a 14-city ATM network up and running.

The move means that neophyte ATM

has taken a key first step toward preventing the lack of interconnection among far-flung network "islands" that has previously derailed promising wide-area technologies such as Integrated Services Digital Network.

Ken Holcomb, vice president of MFS Datanet, estimated that local-area network interconnect services via the T3

(45M bit/sec.)-speed ATM network would average one-eighth to one-sixth the cost of ordering high-speed lines from local and long-distance carriers and investing in equipment that can handle T3.

The pricing that Holcomb outlined for the ATM service was \$8,000 per connected site per month for 45M bit/sec. links within a metropolitan area. For users in-

terconnecting between metropolitan areas, pricing depends on individual customer variables, he said.

"We see a lot of opportunity for ATM in the wide area," said Rosemary Cochran, a principal at Vertical Systems Group, a consultancy in Dedham, Mass., "but timing is an issue." At the moment, there are few local ATM networks needing to link across the wide area, she said.

However, pioneering companies can reap the benefits of MFS Datanet's wide-area ATM service.

Such bleeding-edge firms include Bear, Stearns & Co. in New York, which is already running some wide-area ATM over its own private Synchronous Optical Network metropolitan-area data highway to interconnect clusters of local ATM networks, said Jeff Marshall, senior managing director of communications technology.

The brokerage firm is ready to take advantage of the ATM service now, Marshall said. "We want to get our applications to operate seamlessly around the globe the way they do in the campus," he said. "Carriers such as MCI and BT may have a global presence, but we're starting with MFS because they have been a leader in getting things done."

Government users are also ramping up. The U.S. Environmental Protection Agency, for example, said that any new LAN wiring at the EPA will take advantage of ATM when it comes along, largely to serve desktop video applications.

The only application service MFS Datanet is providing to date is the High-speed LAN Interconnect (HLI) it has been offering since last fall [CW, Oct. 12, 1992]. ATM is not usually touted for its strengths in data-only applications because it is optimized as a compromise for mixing voice, video and data.

But MFS Datanet's advantage in supporting HLI is that "it gives customers native-speed connectivity for Ethernet or Token Ring without them having to pay expensive fees to the interexchange carrier for T3 lines," Holcomb said.

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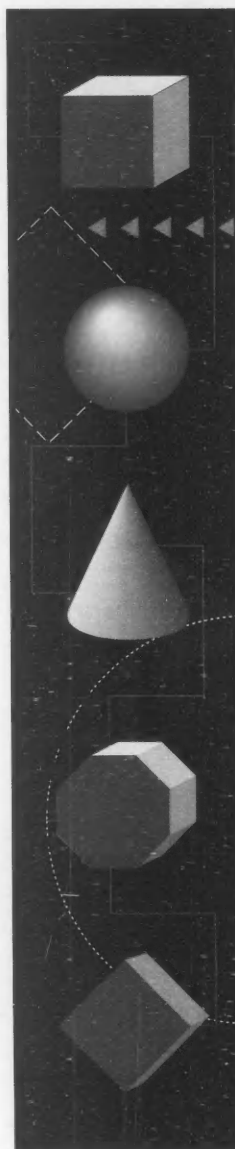
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### Up and running

MFS Datanet has initially linked the following areas in its wide-area ATM network: Atlanta, Baltimore, Boston, Chicago, Dallas, Houston, Los Angeles, Minneapolis, New York, Northern New Jersey, Philadelphia, Pittsburgh, San Francisco and Washington, D.C.

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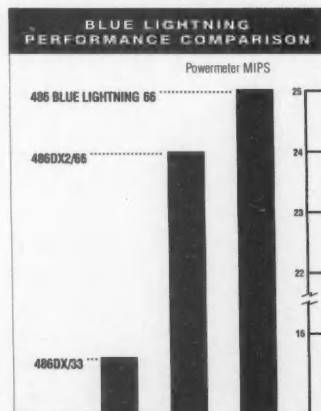
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<b>External clock</b>	33 MHz	33 MHz	33 MHz
<b>System case</b>	Desktop	Desktop	Desktop
<b>RAM</b>	8MB	8MB	8MB
<b>Cache</b>	<b>256KB</b>	128KB	—
<b>Floppy</b>	One	One	One
<b>Hard disk</b>	340MB	340MB	340MB
<b>Onboard SCSI</b>	✓	—	—
<b>Local bus</b>	✓VESA	✓VESA	✓
<b>Video</b>	Win accel w/1MB	Win accel w/1MB	Win accel w/512KB
<b>Color monitor</b>	15" FST*	15" FST	15" FST
<b>Pentium-ready</b>	✓	✓	✓
<b>DOS 6.0, Windows 3.1, mouse</b>	✓	✓MS Works for Windows	✓
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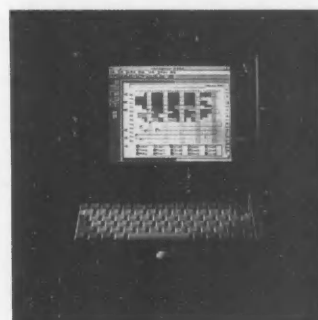
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<b>Bus type</b>	EISA	EISA
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<b>Cache</b>	256KB	256KB
<b>Floppy</b>	One	Two
<b>Hard disk</b>	<b>540MB SCSI</b>	500MB IDE
<b>Onboard SCSI</b>	✓Dual 32-bit	—
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<b>Video</b>	<b>ATI™ Ultra Pro w/2MB DRAM</b>	Win accel w/512KB
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<b>DOS 6.0, Windows 3.1, mouse</b>	✓	✓
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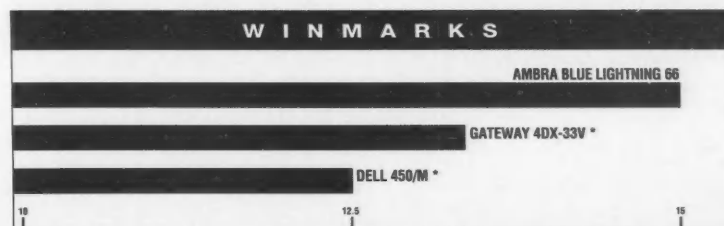
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## Tech

## Talk

### Voice recognition

Last week, Macintosh developer Articulate Systems, Inc. and Voice Processing Corp., a maker of voice-recognition systems, announced plans for the first over-the-phone speech recognition system for the Apple Computer, Inc. platform. The two will develop desktop applications for Apple's new digital signal processor-based Centris 660AV and Quadra 840AV Macintosh models.

Products resulting from the alliance, which will ship under Articulate's PowerSecretary brand name, could begin shipping by year's end. The partners will also offer Apple developers a telephony speech recognition tool kit suitable for phone-to-phone applications.

### Blue light special

IBM recently used a solid-state, blue-light laser in an optical recording system that was able to read and write data at a record 2.5 billion bits (gigabits) per square inch. Higher-frequency blue light can be focused into a smaller spot on an optical disc than current infrared light systems.

At the new recording density, a 5½-inch optical disc could hold 6.5G bytes, a density five times higher than today's best rewritable optical discs. IBM's experimental system takes infrared light output from a gallium-aluminum-arsenide diode laser and passes it through a frequency-doubling device. Company scientists said they hoped to have a commercial version of the technology in four to five years.

### Record quiet

IBM has applied for a *Guinness Book of World Records* citation for creating what it calls the quietest place on earth. The echoless testing room at IBM's Boca Raton, Fla., facility eliminates 99.99% of noise, the company said. The room is lined with sound-absorbing fiberglass wedges and sits on its own foundations to prevent vibrations. The 1992 edition of the book lists a "dead room" at a Bell Telephone System laboratory in Murray Hill, N.J., as the quietest.

# Secret agents of software

MIT hopes apprentice agent technology will increase productivity

By Michael Vizard

While users today enjoy the benefits of the many tasks that supposedly have been automated by software, the reality is that these applications are still rife with the same repetitive processes as the old paper-based system.

As such, the electronic format certainly makes it easier to file and merge information, but it does precious little to automate the drudgery of performing the tasks that consume the average worker's day.

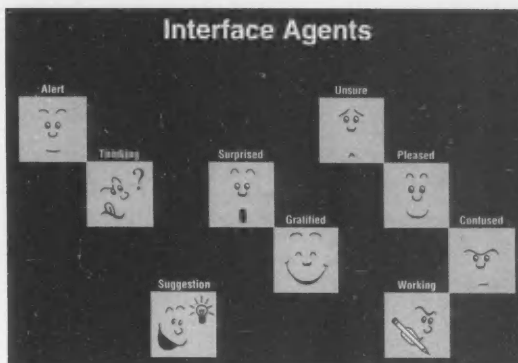
The folks at the MIT Media Laboratory have been giving this situation a great deal of thought lately and have some progress to report.

Funded by Apple Computer, Inc. and the National Science Foundation, MIT has been developing agent technology that can essentially learn how a person tends to use his software. The agent software monitors a user's behavior pattern and, using previous activities as a model, guesses the response the user would make under a set of circumstances.

For example, if the agent software detects that every Monday morning a user downloads a specific set of database files into a spreadsheet, it will automatically download those files into a spreadsheet every Monday. Or the agent may detect that the user never refuses an electronic-mail borne request for a meeting from "Johns, P." Using this knowledge, the agent will automatically respond in the affirmative to any meeting request from this person; if the agent has learned the user does not accept meetings on Monday mornings, it will deny all conflicting requests.

#### Prototype ready

Led by MIT Associate Professor Pattie Maes, developers at the lab have created a prototype of their agent technology written in LISP that runs on top of the Eudora E-mail system for the Macintosh. The next step for the researchers is to convert their program into C



MIT agents use icons to tell users when they need more information or if they have a suggestion for automating a particular task

language code that can be attached more readily to existing commercial programs. This work is scheduled to be completed by year's end.

According to Maes, building flexibility into the agents was a critical goal. The agents develop different confidence levels for each task as they monitor a user's activities. Users can set thresholds that specify if the agent should notify them of a particular action before it is taken or simply go ahead and perform the function.

In this way, agents are capable of learning, she said. In fact, the agents can learn from

imitating examples drawn from memory, responding to user feedback or by being programmed by a series of examples created by the user.

Maes said end users may begin seeing a new generation of agent technology in late 1994.

"We wanted to make sure it would be easy to teach agents, as opposed to having a set of abstract rules. End users won't deal with conflicts among rules or maintain rules," Maes said.

The MIT approach differs from traditional artificial intelligence programs, which try to infer the user's ultimate goal by using rules with preprogrammed knowledge—an approach that requires large amounts of memory.

Maes said she can create agents that will only take up about 30K bytes of memory.



MIT's Pattie Maes: 'End users won't deal with conflict among rules'

### Honey, print the paper, will ya?

Agent technology will be incorporated into "News in the Future," a project that hopes to bring forth the age of electronic newspapers.

The program, which uses the "learning" agents technology developed at MIT, is being funded by 18 media, computer and software companies.

MIT will spend about \$2 million annually on the project, which will range in scope from putting electronic copies of newspapers on-line to creating reusable paper on which indi-

viduals will print out their personal newspapers each day.

The project is also looking at ways to create discussion databases around news articles and ways to give electronic newspapers the intelligence to associate related articles.

"For example, an article might not mention the word 'terrorism,' but the system would have the knowledge to associate this article with a search for articles related to terrorism," MIT Associate Professor Pattie Maes said.

—Michael Vizard

## They're here!

My department's editorial retreat last week featured a CIO roundtable discussion during which the conversation turned to the burgeoning wave of personal digital assistants, or PDAs, about to crash ashore.

About a year earlier at a computer industry conference, Apple's John Sculley talked about the eventual arrival of Newton, the most-awaited PDA. What he said was pretty remarkable to me: He didn't know what Newton would be or, for that matter, how it would be widely used. That was prophetic if nothing else.

One of the CIOs at our retreat said the last thing he wants is another digital wonder to hang off his trousers, cram into his vest pocket or stuff into his overstuffed briefcase, particularly when it's unclear what the device will do. A much better idea, he said, would be to build such a device into a briefcase, just like a lock. Just like a full-function calculator. Just as cheap.

Back to Sculley's conundrum of just what these things will do for you. They will recognize handwriting. But whose? If it can recognize my long-hand, then it's smarter than I am because I can't recognize my writing half the time. It might recognize my printing. Now that's efficient. It will also provide me with a nice appointment calendar. All this for only \$700.

This is not a column about Sculley, Newton or PDAs. It's about a throw-it-against-the-wall-and-see-what-sticks approach to new technology that doesn't do flip to help IS solve problems. You can pick out other technologies that ride into the marketplace with this approach and find they suffer from the same debilitating illness of being technology in search of a market.

Such homeless technologies wouldn't be a problem if they could be ignored. Unfortunately, they can't be. Part of the problem rests with the media, of which we are a part, that too often fails to ask the right questions when some starry, new-wave product rolls out.

Also, it is difficult to ignore the pleadings of end users, who can easily become enamored of technology for its own sake. And as we pointed out in our story on "shadow IS" spending, user departments are finding ways to spend money outside the purview of IS [CW, July 26]. That would be fine, too, if end users didn't eventually seek the help of IS when managing the things they've acquired independently. But the fact is that a lot of technology bought independently by end-user departments, such as incompatible LANs, has come to roost in the IS department.

The heartening news is that most of these throw-it-against-the-wall technologies eventually succumb beneath the weight of their own press releases. While that's bad for our forests, it does at least provide a costly lesson to technology providers that refuse to view the world through the eyes of people who really don't want any more junk hanging off their pants.

*Bill Laberis*

Bill Laberis, Editor in chief



## Customer (dis)service

Esther Dyson's column "Just-in-time training" [CW, July 19] tells how computers can assist us in the depersonalization of everybody. Make each customer or prospect a profit center and let the computer assign a profitability number to each. If the number is too low, the customer is worthless.

This is not only callous, it is a stupid business plan. How can companies profitably grow just by selling more to the people who are already their best customers?

Dyson should realize that abandoning a customer is a rejection of opportunity. Listen to the customers who nobody wants, find the opportunity to satisfy them and re-engineer your firm to do it efficiently. If you can do this, you will be good enough to also win your competitors' most prized customers.

I do not like to do business with anyone who lets his computer decide if he should care about me, and those who assign this role to a system assault my dignity and their own.

At Christians  
Lake Oswego, Ore.

## Mail shortage

"Users narrow E-mail product lineup" [CW, July 19] on corporate electronic-mail gateways was interesting, but what happened to any mention of the use of public services such as AT&T Mail, MCI Mail and CompuServe? Companies with many sites would do well to consider these alternatives.

Also, it appears to me that Creative Network Strategies' cost comparison for a two-page fax in the accompanying chart is way out of line. If its \$9.74 per fax is for real, and you have a PC with a modem, for the same price you could send that fax on CompuServe and get a free membership, even if you sent only one fax per month!

David W. Stover  
Pasadena, Calif.

## Dealing with disaster

"No one could have predicted a river would swallow our Des Moines building," said an MIS manager in "Data dowsed in Midwest floods" [CW, July 19].

Not so! This is exactly what experienced risk managers do. For example, it is essential to check the site plan of a building near a river to determine if the building's basement is above the "50-year" flood plan elevation.

A CIO would not dream of using a risk manager to integrate a new Unix environment. Why would he depend on an MIS manager to evaluate this?

Robert V. Jacobson  
New York, N.Y.

or simple adherence to accepted standards, would simplify the lives of IS management immensely. The checkered success record of implementation for the variety of industry-standard machines continues to wreak havoc with large-scale PC implementations.

Frequently, it is the price aspect of price/performance that dictates the purchasing decision, without sufficient regard to the performance end of the equation. Too often either a very competitively priced machine is physically incapable of providing the horsepower to run applications or the support of such a mainframe is an over-involved task at best.

In too many cases, one is faced with continual assaults on the budget to justify equipment that will undoubtedly prove its worth in the long run, but the issues are often reduced to the bottom line. Perhaps it is time to bring the manufacturers on a shorter leash or, more appropriately, develop a purer definition of precisely what is meant by "industry standard."

John Harding  
Marietta, Ga.



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## What's 'standard'?

I would like to add my endorsement to the statements outlined in David B. Ciolkowski's article "Cutting through the hype" [CW, July 26]. The concept of more stringent standards for PC manufacturers,

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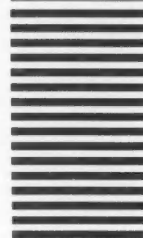
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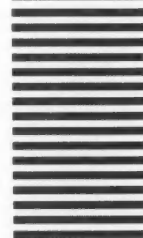
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## Viewpoint

# Help upgrade the U.S. educational system

Gary J. Beach

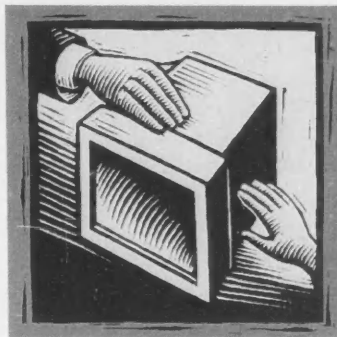
Emerson once said, "The challenge ahead of us is never as great as the power behind us." I want to talk about a very big challenge that we have the power to meet collectively — integrating computer technology into the fabric of the U.S. educational system.

You'll see a full-page notice about the launching of The Computers For Classrooms Foundation on page 92 of this issue. This is not a foundation in the traditional sense. It is a "virtual foundation," a concept around which we hope many people, as individuals, will rally.

There are no meetings, no dues, no committee reports. To join this organization, all you have to do is take an action to accelerate the introduction of information technology into U.S. classrooms.

Walk around your local school when it opens next month. If it's like the one in my community, it will have a computer room where students go a few times a week to learn "computer."

U.S. schools have to stop teaching "computer," in the same way they teach music — as a separate subject — and start integrating the computer into the whole learning process. Why? Because the sheer quantity of information available for learning today demands a technology-based solution. And because realities of all kinds are now changing so quickly that textbooks are outdated even before they



reach the classroom.

Schools can't educate the way they should without our help. They don't have the budgets to purchase what they need, and vendors aren't inclined to give it to them. But chances are that you have good-quality used machines and unopened copies of software occupying space in a storage closet somewhere.

Computerworld recently conducted an analysis of its computer inventory and discovered that for every 55 employees, there was one computer available to donate. If your company has 1,000 employees, chances are it has 18 computers that it could donate to a school.

Even if you don't have equipment or software, you have another sorely needed resource — your own hard-won professional knowledge. It took those of us in the field 13 years to figure out that, by itself, putting computers on desks accomplishes nothing. Productivity only emerges when work is re-engineered to take maximum advantage of computer resources. That's knowledge that could save educators a lot of missteps.

Pick up the phone and ask your local school officials what's needed. Ask if they have a game plan for blending technology into their learning regimen; if they need help selecting the right products or getting those products; or if they need someone to do teacher training.

Become part of the solution. Join our virtual foundation and help wire our country's classrooms to the larger world of information. When you do, send me a note and let me know what



you've accomplished. I'll fill you in on how we're working with Congress to put phone jacks into classrooms as well as with vendors to make software donation easier through co-licensing.

Beach is publisher of Computerworld. You can reach him on MCI mail at 507-7872 or by writing to him at our editorial office address on the masthead at left.

# The secret shame of client/server development

ADVENTURES IN INFORMATION by Patricia B. Seybold

Three years ago, Mitch Kapor stood up at Esther Dyson's conference and spoke about the "secret shame" of the PC industry: PCs were too hard to use, and none of us was willing to admit it. Mitch was right. We were all participating in a shameful scam — pretending that computers were easy to use when most of us knew differently from personal experience.

Now there's another scam in progress. People are stampeding toward client/server application development because they are being told it's easy, and that's just not true.

No matter what application development tools you choose, it's extremely difficult to design a high-performance client/server application. It's worse than a black art. As one frustrated customer put it, "We've done about 12 projects now, some in-house and some contracted out. Less than half were successful, and we don't even know why some work and some don't."

The most popular way to implement client/server applications is to split the functionality right down the middle. You put the user interface and the application on the PC, and you store the data on a database server. When the user's program requests information, the PC program splits SQL requests to the database server, and the server returns the requested in-

formation. A piece of cake, right? Well, not exactly.

The problem is this model only works well for very small result sets. When the database server must return larger amounts of information, the network bogs down and so does the server's ability to service other requests.

What makes things even trickier is that it's extremely difficult to predict the size of a result set. Any assumptions you make about how much information people will need or want are likely to be wrong, particularly if users are in the throes of their first exposure to the seductive lure of point-and-click graphical access tools.

Having encountered this dilemma a few times, developers are getting smarter. Now they're restricting end-user access to a set of canned SQL queries. They're using triggers to do more processing on the back end and to deliver result sets to end users in conveniently sized batches (convenient for LAN traffic control, that is).

These are reasonable tactics given the limitations of current products, but they aren't a solution. Limited access is not what most businesspeople want. Users want, and should have, the ability to grovel around in the database doing what-if scenarios, updating records and adding fields and relationships at will.

We need better and more transparent tools for client/server application development. This means tools that do the following:

- Don't presume a simplistic split between client GUI application logic and back-end database services.
- Take into account trade-offs that must be made for different network topologies and bandwidths.
- Optimize performance by sliding the processing logic from the client to the server, depending on the type of request and the traffic.
- Will accommodate more sophisticated aspects of distributed computing, such as remote procedure calls and object messaging, without requiring developers to stand on their heads and twiddle their toes.



In the meantime, don't ever be ashamed to admit that it's very hard to develop client/server applications. Anyone who's honest will tell you you're right.

Seybold is president of the Patricia Seybold Group, a research, consulting and publishing firm in Boston that specializes in distributed computing for networked organizations. Her Notes address is Patricia Seybold @ PSCG. Her Internet address is Pseybold @ MCI-mail.com.

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## LAN-locked

If it's difficult to manage a LAN right under your nose, what are you going to say when the boss calls demanding to know why his remote access device isn't connecting over the spread-spectrum radio frequency? Mobile workers are extending the corporate network, and all the problems of managing the network are going to be extended along with them.

It's not just the boss, either. More employees are spending time outside the office. Whether visiting customers, scout-



ing the competition or merely camping out in someone else's office, they will continue to need a virtual link to their home office.

The form that link should take is being debated in IS shops today. Should mobile workers run a machine at the home office by remote control, or should they become

nodes on an extended network, with all the services of a home user?

Until recently, the latter was not a realistic possibility. Laptops were an atomized extension of corporate information systems, carrying data and providing a modem link to home base, but the link was tenuous. Laptops functioned best as stand-alone machines, a weight added to the backpacks of corporate voyagers.

As the number of laptops exploded during the last three years, however, users began to agitate for the ability to use them as remote nodes — computers on the network rather than dumb terminals. Recent software additions have made that possible over a phone hookup for specific functions, such as CC-Mail Remote from Lotus or RemoteWare from Xcellenet.

Wireless communications, however, still have a long way to go because cellular phone services provide transmissions of uneven quality. The protocols of mobile radio-based systems do not match those of corporate nets without heavy customization. And satellite-based feeds, which can be launched from anywhere, are expensive compared with land-based means.

Once attached to a phone line hookup, the laptops themselves have become more mobile in most other respects. I carry a 6-pound, 386-based CompuDyne equipped with a fax modem that to me is speedy, easy to read and comfortable with a full keyboard. But it is also passe, according to those who are really into mobile computing.

Four-pound subnotebooks with active-matrix color are now available, and regular notebooks come with credit-card-size plug-in fax modems, LAN adapters, hard drives and extra memory.

No matter how tiny the peripherals, however, the Achilles' heel of mobile computing remains the lack of support in the LAN operating system. IS managers should take a look at what their needs are going to be and advise LAN vendors of their mobile priorities. The following are a few suggestions you might want to put on your lists:

- LANs should be able to recognize a remote node user and provide remote node services, but most can't.
- A LAN should try to prevent accidental cancellation of a call due to noise on the long-distance connection.
- LANs should minimize the amount of time that a mobile worker needs to be connected, reducing the phone bill.
- LANs should offer minimal data synchronization services for mobile workers. Lotus' Notes is one of the few ways to get synchronization, but the service is needed on more than an application-by-application basis.
- LANs should provide virtual connectivity, which allows the mobile worker to prepare to send E-mail and faxes or print out files as if at the home office but store them in a buffer until the worker reconnects. Novell's Personal NetWare will provide several of these features, but no one has yet provided all of them.

Babcock is *Computerworld's* technical editor. His MCI Mail address is 575-2737.

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by Jim Cannavino, IBM Sr. VP and General Manager of Personal Systems; interactive elective sessions on the latest in OS/2,\* LAN Systems, 32-bit graphics, object-oriented programming, multimedia, pen, database and communications; OS/2 and LAN labs; and an exhibit area with demos of vendor software that exploits PSP products. There will be special bonuses, product raffles and an active schedule that even includes a "special event."

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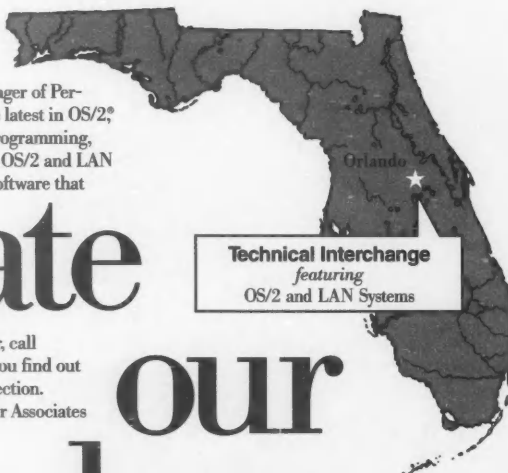
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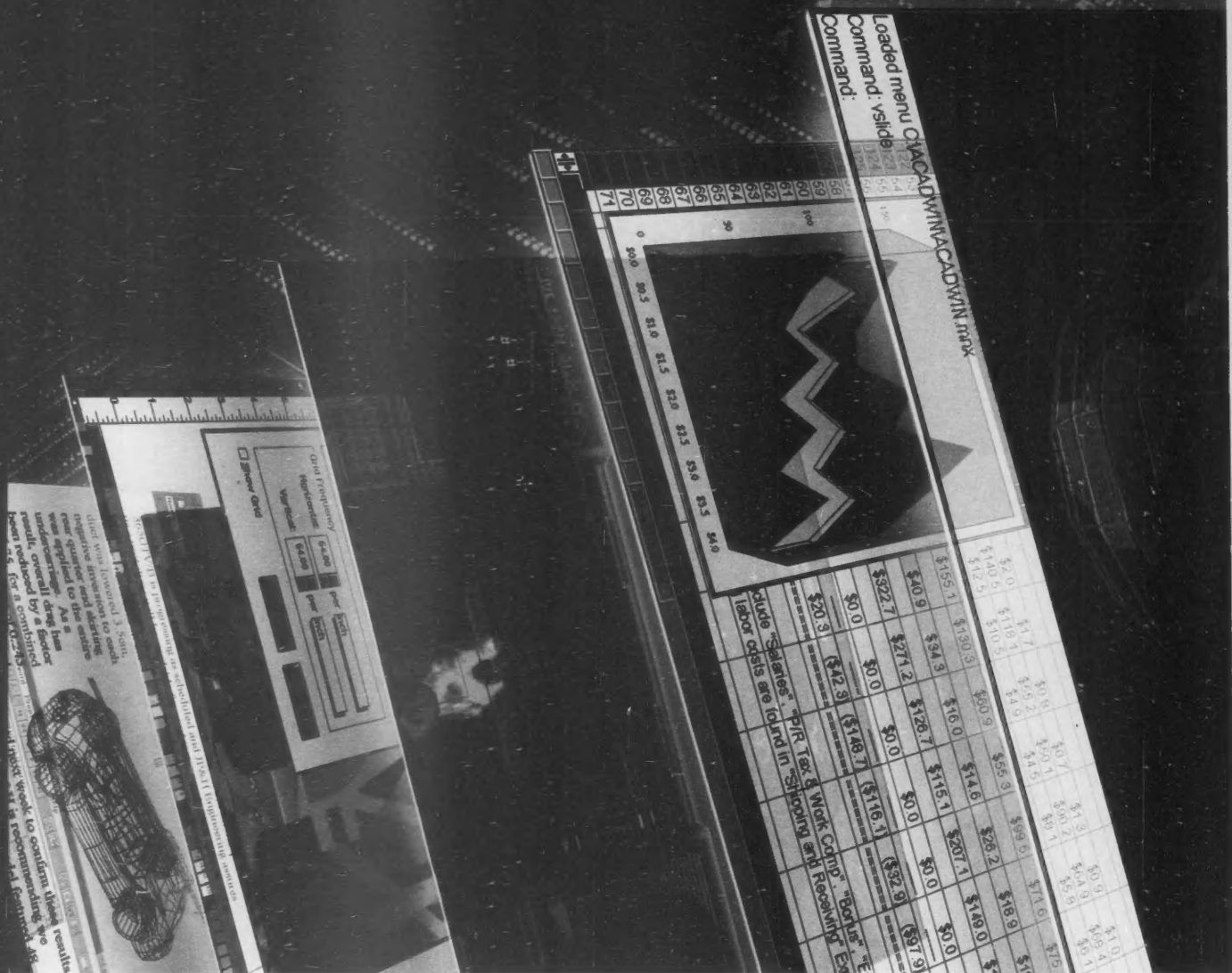
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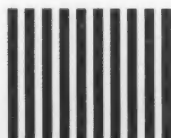
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## The wait goes on for color notebook buyers

By Michael Fitzgerald

Users interested in moving to color notebooks are experiencing *deja vu*: As with the desktop last year, demand has vanquished supply.

An angry Louis Kahn, chief network administrator at the Centers for Disease Control's National Immunization Program, said even though he wants only five LTE Lite 425Cs from his vendor, Compaq Computer Corp., and has a contract that guaranteed delivery of the products earlier this month, he has no idea when he will actually get the machines.

"They're blaming Sharp saying they can't get the screens," Kahn said. He added that Compaq has told him his machines are stuck in a 10,000 unit backlog that has no end in sight.

Analysts say users like Kahn are caught in a vise of component shortages and unexpected demand, and the problem extends across notebook vendors.

"Color demand has ramped up phenomenally — we threw out our initial forecasts for this year and have doubled them," said Jeffrey Henning, an analyst at BIS Strategic Decisions in Norwell, Mass.

Demand for color notebooks has created a backlog situation

for several reasons: Only two vendors can ship the big 8.4-, 9.5- and 10.4-in. thin-film transistor (TFT) active-matrix color displays in volume — Sharp Corp. and Display Technologies, Inc. (DTI), the IBM/Toshiba Corp. joint venture. Of these two, DTI's supply is completely soaked up by IBM and Toshiba. NEC Corp. is expected to start a production line up, but not until early 1994. Also, more PC makers want to offer TFT color now, up from just a handful of vendors as recently as the middle of last year.

### Caught off guard

The sharp rise in demand for TFT active-matrix color notebooks, spurred in part by IBM PC Co.'s aggressively priced ThinkPad product line, has also caught component suppliers by surprise. Vendor sources, speaking anonymously, pointed to color separation filter dyes as the main component problem.

However, only three vendors in the world supply components. These suppliers have told Sharp and DTI they will be unable to catch up with demand until the end of the year. Plus, DTI and Sharp have limited capacity, and the exceedingly complex manufacturing process continues to have low TFT yields, which exacerbate the problem.

Analysts said demand for smaller TFT screens that are easier and more profitable to build has worsened the supply of bigger screens.

"Japan, for instance, has a ton of pachinko parlors [gaming rooms], and more and more of these are using small LCD panels, which are

more profitable to produce," said Bruce Stephen, an analyst at International Data Corp. in Framingham, Mass.

"If the best of breed, big panels were widely available, this market would really take off," Stephen added.

Supply is also uneven. New York Life Insurance Co., for instance, can get color Versas from NEC Technologies, Inc. because it is NEC's largest notebook customer in the U.S. New York Life has temporarily removed the IBM ThinkPad from its product listing, though.

"We can't get our hands on the IBM note-

books, though they're saying we might be able to get a decent amount next month," said Victor Mutnick, New York Life's vice president of corporate information systems.

Mutnick said he was almost glad to hear about widespread supply problems for active-matrix color notebooks. "Our users hold us responsible for not getting those systems in, so it's good to see that it's an industrywide problem."



IBM PC Co.'s ThinkPad 350C

## Graphics packages en route

### Software Publishing to release Harvard Graphics update

By Michael Vizard  
SANTA CLARA, CALIF.

► After having lost its dominance in the presentation graphics arena during its migration from DOS to Windows, Software Publishing Corp. plans to launch this week what observers view as its first credible effort in the Windows market.

Harvard Graphics 2.0 for Windows rewards users of the company's DOS product who remained loyal while Software Publishing struggled to take advantage of the Windows environment.

"I was concerned, but now I feel much happier about them as a product and a company. The new release is light-years faster and more user-friendly," said Willie Reichenstein, PC application specialist at American Savings Bank in Irvine, Calif.

### Willing to wait

Reichenstein said he remained faithful to Harvard Graphics, despite the presence of better presentation graphics packages for Windows from companies such as Microsoft Corp. and Lotus Development Corp., because the costs of converting applications and retraining users were prohibitive compared with the benefits to be gained.

He also noted that while Lotus has symbols that make it easier to use, Harvard Graphics handles data imported from Lotus 1-2-3 spreadsheets better.

In addition to being a more robust Windows implementation, Harvard Graphics 2.0 includes an Advisor feature that offers design tips, a Quick Look feature that provides previews of charts as they are being built and a customizable icon bar.

But Reichenstein said his favorite feature is the ability to display a presentation on 64 different computer systems across a network. This desktop conferencing ability comes with a Chalk tool that allows users to make annotations online. American Savings Bank will use this feature to allow users to conduct an electronic meeting between its Irvine and Stockton, Calif., offices.

"We tried using a videoconferencing application for this, but you have to turn the camera on the PC screen and the image gets fuzzy," Reichenstein said.

Pricing for Harvard Graphics, which will ship at the end of this month, is \$395. Upgrade pricing is \$89 through the end of this year.

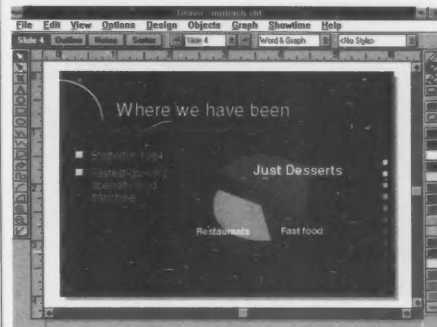
### Alpha Software to enter Windows presentation graphics market

By Michael Vizard  
BURLINGTON, MASS.

► After several months of manufacturing delays, Alpha Software Corp. is set to ship this month what is praised by one analyst as the most technically creative presentation graphics package available for Windows.

But whether Alpha Software has the marketing clout to support this package is very much in doubt, according to industry analysts.

Dubbed Bravo, the latest entry into the crowded presentation graphics market boasts a number of technical



Alpha Software's Bravo allows users to import graphics that were created by other Bravo users

achievements, including tight integration with spreadsheets and the ability to work with data from other presentations.

In addition, Alpha Software has chosen to aggressively price Bravo at \$79, which is several hundred dollars less than competing packages from market leaders such as Microsoft Corp., Lotus Development Corp., WordPerfect Corp. and Software Publishing Corp. [CW, July 19].

"Technically, Bravo is a great product. The challenge for them will be marketing," said Jeffrey Henning, an industry analyst at BIS Strategic Decisions in Norwell, Mass.

To overcome this problem, Alpha Software intends to emphasize the technical merits of a low-cost Bravo package, Alpha, page 46

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<sup>†</sup>Survey was independently conducted by Reliability Ratings, Needham MA. The data is quoted from a 40-page report available for purchase through Reliability Ratings (617) 444-5755. Reliability Ratings, the research company, is not affiliated with Dell Computer Corporation and does not endorse its products. <sup>\*</sup>Guarantees available in USA only for registered owners of Dell Performance Series systems purchased after 7/1/92. For a complete copy, please call our TechFax<sup>™</sup> line at 1-800-950-1329 or write Dell USA L.P., 9505 Arboretum Blvd., Austin TX 78759-7299. <sup>\*\*</sup>Source: Dataquest, Inc., Nov. 1992. <sup>\*\*\*</sup>On-site service provided by BancTec Service Corporation. On-site service may not be available in certain remote areas. The Intel Inside logo is a registered trademark and i486 and Overdrive are trademarks of Intel Corporation. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.

Christopher Lindquist

## NT users sound off



Windows NT is here!

OK, so it's not *really* here, but "Windows NT is going into production!" is too wordy. Of course, a sentence that accurately reflected just how long customers have been reading

about Windows NT would go something like "Windows NT has finally, after several delays and a couple of years of ballyhoo, gone into the production phase where it will be transferred to CD-ROM and floppy disks, put in boxes with manuals and distributed to resellers and customers—in about three weeks."

Only Microsoft could create as much hype around a nonevent as this "release to production" will cause.

Say "NT" without the preceding "Windows" to a Microsoft person some day

and watch his reaction. You'd think you were kicking his dog. Same thing happens if you say "DOS 6.0" instead of "MS-DOS 6.0." In that case, of course, you are kicking his dog.

Enough baseless pokes at Microsoft. I'll stop now. On to the pokes that have a base: the experience of users as shared on bulletin boards.

Long, long ago, NT was going to be a 32-bit version of Windows that everyone could use. Hardware requirements were going to be 6M bytes of memory on a 386DX machine. Anyone with such hardware could enjoy the benefits of working with a multitasking, multithreading, hard-to-kill version of Windows.

Now the word from Redmond is that the vast majority of people should stick with Windows 3.1 and wait for Chicago if they want a 32-bit operating system. Needless to say, this has some customers a bit perturbed.

Here's a sample from a San Francisco bulletin board service:

"I don't know if this is funny or sad. It seems that the faithful Windows users who want 32-bit processing are forever waiting for something from Microsoft! Many thought NT would be the answer and have been waiting and waiting for it. Now that the product is approaching shipping time and the positioning of the product is becoming more clear, those faithful users are suddenly being told

that Win 4.0 is what they really want!"

That particular "faithful Windows user" is currently running OS/2.

And for those of you who are going to wait for what has been called Chicago, this bit from another board might be interesting:

"According to reliable sources, it appears that Chicago applications, while multitasked preemptively in relation to one another, will feature cooperative multitasking internally within the individual applications. That's right—no true multithreading; just some sort of cooperative kludge."

What does this mean for you? I'm sure Microsoft will have an answer by the time it releases Chicago to production.

I mentioned in a previous column that NT's architecture was death on devices that wanted to directly manipulate system hardware. One such piece of hardware: the "dongle" security devices that plug into a parallel port to prevent piracy.

However, it seems there is a workaround.

"What has to be done is that the software author has to register a .DLL under CONFIG.NT, and the .DLL tells NT that it can take care of these port addresses. Only then you can get the program running. If the manufacturer tells you what port addresses are being accessed, then you can write your own DLL to do this,

but I suspect this is not what most end users want to do."

I suspect his suspicion is correct.

This next one is an adjunct to NT discussions, and it concerns Microsoft's Remote Access Services (RAS), which allow dial-in access to NT systems. Seems Microsoft is going to remove RAS from Windows for Workgroups. Some users are not pleased.

"[Microsoft], apparently, has made up its mind that it is going to drop RAS from [Windows for Workgroups]—a really dumb decision.... But, alas, they appear to have dug in their heels about this matter and are going to drop this critical feature regardless of how important customers feel that it is to their enterprise."

Ever feel that whenever Microsoft digs in its heels about something that it's standing on your back? You are not alone.

*This will be my last column as a Computerworld employee. Most of my electronic connections will be temporarily severed for the next few weeks as I settle into a new position as technical editor of a new IDG publication called Electronic Entertainment. Watch this space, however, and send any suggestions to my one permanent connection via Internet at [chrisl@netcom.com](mailto:chrisl@netcom.com).*

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## Microsoft readies Office 4.0

By Michael Vizard  
REDMOND, WASH.

As part of a long-term drive designed to make the Office suite its primary software application, Microsoft Corp. has started previewing a suite strategy that calls for applications to work in close cooperation with others.

Using Version 2.0 of its Object Linking and Embedding (OLE) interface, Microsoft intends to show that its applications are becoming integrated to the point where they are almost indistinguishable from one another.

"It's about breaking down the barriers between applications," said Kathleen Schoenfelder, Microsoft general manager for Excel.

### Sneak previews

In an attempt to drum up excitement over its forthcoming generation of Windows applications, Microsoft has previewed some features that it will include in Excel 5.0 and Word 6.0.

The new releases are the core offerings in the Office 4.0 suite, which Microsoft will begin selling this fall, said Steve Ballmer, a Microsoft executive vice president.

However, delivery of the full Office 4.0 suite is likely to come in piecemeal as some applications in the suite become ready before others, he said.

Once they are delivered, however, Microsoft maintains that their level of integration will raise the bar for what users

will expect from Windows applications.

"Users will be able to seamlessly move around all applications and use any function," said Mike Maples, a Microsoft executive vice president.

### Visual Basic support

In addition to OLE 2.0, Office will support the use of Visual Basic as a common macro language; cross-application Wizards that automate specific tasks; context-sensitive agents, called IntelliSense, that will customize applications to a particular user's habits; and a Pivot table query tool that will let applications draw in data from external sources.

The agent technology that Microsoft is including represents the first in a series of agents that are expected to become more proactive as the technology matures, Schoenfelder said (see story page 31).

Meanwhile, Excel will also make use of Pivot tables to allow users to view data in different dimensions and to organize that data into workbooks.

"Unlike other multidimensional spreadsheets, you won't have to predetermine the range of data you want to work with in order to have that data included in the spreadsheet," Schoenfelder said.

"Making applications function as documents will become the definition of an application in 1994. Some of our competitors are just catching up to where Windows was three years ago. The world is about to shift again," Maples said.



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# LAN READY, UH, UH, UH, SET, UH, UH, WAIT A SECOND, UH, GO.



# Lotus does Windows right

By Garry Ray

It has been nearly three years since Lotus Development Corp., the Cambridge, Mass.-based maker of 1-2-3, first began showing the Windows incarnation of its popular spreadsheet program.

Unfortunately, reviews and user reports on that first version of 1-2-3 for Windows were not flattering. 1-2-3 for Macintosh, released

about a year later, was called "the spreadsheet that 1-2-3 for Windows should have been."

Now, Lotus appears finally to have gotten things right. Its 1-2-3 Release 4 for Windows, which was announced in May, is a full-blooded Windows program that takes complete advantage of the environment's capabilities and, at the same time, adds a wealth of enticing features to the venerable spreadsheet. In fact, there are far too many new and enhanced features to cover here. Suffice it to say, Release 4 is now the product to beat in the ongoing spreadsheet war with rivals such as Microsoft Corp. and Borland International, Inc.

## Full of features

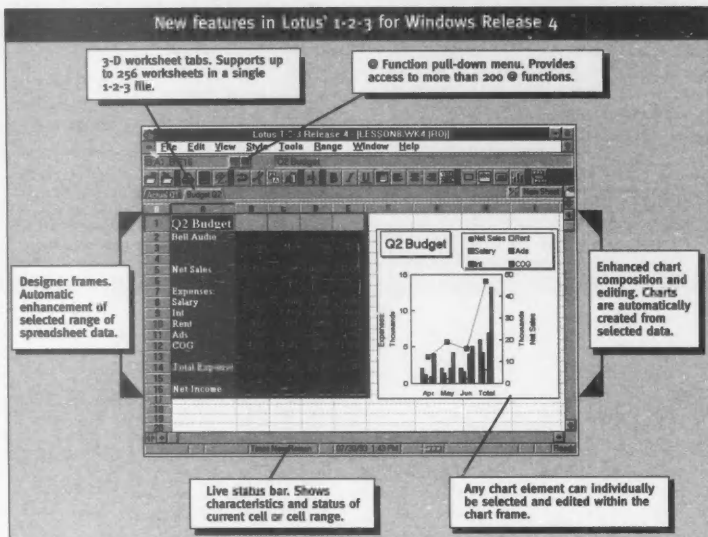
Anyone experienced with previous versions of the program will be impressed with an initial run of Release 4.

Beginning with a revamped pull-down menu system, the enhancements include a variety of context-sensitive mouse pointers, Quick Menus to change the attributes of any spreadsheet object such as the font in a single cell and in-cell editing to make immediate changes to cell contents.

Other features, not so obvious as the above, have been added to improve the usability of 1-2-3. Release 4 finally makes available row and column selection simply by clicking on the row or column border; Microsoft's Excel has sported this feature for years.

Borrowed from other Lotus products — specifically, from Ami Pro — is the status bar appearing at the bottom of the spreadsheet. In addition to automatically displaying the style, font and numeric format of any selected spreadsheet item, the status bar makes it possible to easily change any of those attributes by clicking on the bar and selecting new attributes from its menu.

Also adopted from Ami Pro are a range of presentation and dialog box features. For example, select-



ing the option to change a background color brings to the screen a palette of the 256 colors available for such purposes. Along the same lines, the fonts and attributes dialog boxes include a preview mode that displays potential changes before they are made. The dialog box shows a listing of all available fonts, along with a sample display of the font being considered.

This new emphasis on usability and presentation carries over most effectively to the much-improved charting module.

In previous versions of 1-2-3 for Windows, creating and printing charts was a kludgy procedure. Release 4 simplifies the process by seamlessly integrating the chart-

ing and spreadsheet modules.

First, there is an "intelligent" charting mechanism that accurately derives chart labels, headings and data from a selected range; a user needs only to select the desired range and the Tools Chart command (or click on the associated 1-2-3 SmartIcon) to create a graphic. This feature also works with "collections" of spreadsheet data, which are non-contiguous ranges of cells, columns or rows (collections being an equally important addition to Release 4).

Once a range is selected, the mouse pointer changes to a charting icon, prompting the user to position and size a chart window

overlying the spreadsheet. The chart that subsequently appears can easily be edited by double-clicking on any chart element. A separate drawing layer and drawing tools — originally introduced with 1-2-3 for Macintosh — can be used to enhance the chart or any other element in the spreadsheet.

## Scenario swap

Users who share spreadsheet data with others, or who create multiple versions of a spreadsheet to accommodate various business scenarios, will be enthralled with the Release 4 "version manager." Based on Lotus' Chronicle technology, the version manager allows users to swap various scenarios in and out of the spreadsheet with only a few mouse clicks.

For example, a quarterly budget could contain best-case, likely case and worst-case scenarios. Using the version manager, these alternatives can be swapped in and out of the spreadsheet to determine their effects.

The version manager also supports local-area network-based users working on the same spreadsheet, while a related tool, the version manager index, allows users to create "scenarios" from a group of versions.

There is clearly a lot that is new to Release 4, although there is little room here to cover the more than 120 added @ functions and 250 macro commands, the macro translator that converts older spreadsheets to the new macro format and enhancements to 1-2-3 database functions.

In fact, there is so much added functionality that simple features descriptions do not do the program justice. What 1-2-3 Release 4 for Windows shows is that Lotus can remain true to its users, and, at the same time, lead the charge in the ongoing spreadsheet wars.

## Lotus 1-2-3 Release 4 for Windows

Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, Mass. 02142  
(617) 577-8500

Requires: Microsoft Windows 3.0 or higher, 4M bytes of RAM.

Price: \$495; upgrades \$129.

## Alpha Software

CONTINUED FROM PAGE 41

said Tim Stein, Alpha software director of business development.

For instance, Bravo supports bi-directional links to spreadsheets using the Dynamic Data Exchange facility in Windows. As a result, adjustments to a graph in Bravo will automatically be reflected in either a Microsoft Excel, Lotus 1-2-3 or Borland International, Inc. Quattro Pro spreadsheet.

Bravo also allows a user to import graphs that were created by other Bravo users, with all template and background conversions handled automatically to match that user's current presentation.

Other key features include the

ability to maintain size and point relationships during the editing of a graph, an outliner and sorter facility that can be linked to word processing packages, Smart Data-pictures that automatically wrap around text, 10 drawing tools and text controls.

In addition, Bravo supports object manipulation and blending of images between two objects; the grouping of objects so that, for example, relationships on an organizational chart can be maintained as objects are moved; the ability to import multimedia files and several prepackaged pieces of clip art.

## Quick study

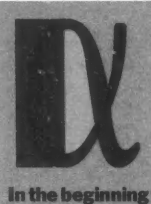
"I used to be a Harvard Graphics user, but Bravo is much simpler to use," said Ed Pike, director of MIS for Leon County, Fla. "You can pick up Bravo and start making presen-

tations. With [Software Publishing's] Harvard Graphics, I had to go to a two-day class to learn how to use it," Pike said.

"My only recommendation is that they bundle more clip art. You hate having to search for clip art," he added.

But Henning said Alpha Software, which until now has focused on databases, is not likely to leverage its existing database position in the presentation graphics arena.

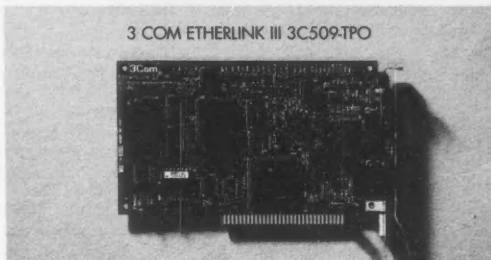
"This is an incredibly crowded field that is dominated by software suites. Many people don't use presentation graphics packages every day, so they are willing to settle for a little less functionality as part of a suite," Henning said. "You wonder how serious Alpha Software is about this market," he added.



Based in Burlington, Mass., Alpha Software has built its name outside of the graphics arena, having produced the DOS-based Alpha Four database management system and several utilities.

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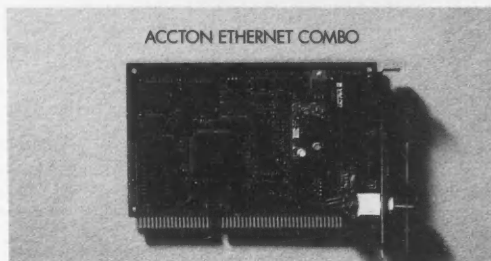
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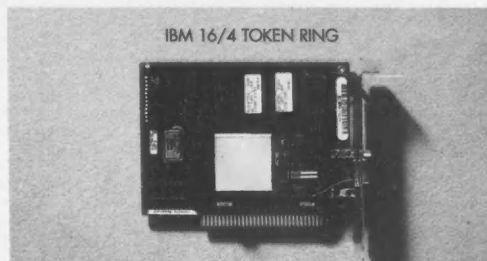
3 COM ETHERLINK III 3C509 COAX



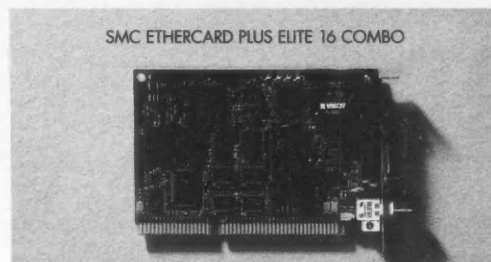
ACCTON ETHERNET COMBO



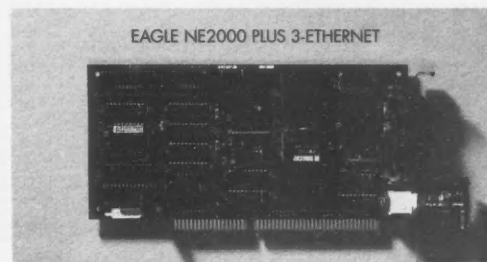
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## Desktop Computing

### Hardware

**Data Technology Corp.** has announced the DTC 3270VL VESA (VL bus), a Small Computer Systems Interface (SCSI) host adapter that provides compatibility with all SCSI and SCSI-2 peripherals.

According to the company, as many as seven SCSI devices, in any combination,

can be connected to the DTC 3270VL, minimizing the use of motherboard slots by these devices.

Support is provided for hard drives, write-once and rewritable optical disc drives, optical scanners, CD-ROM drives and printers.

The product costs \$169.

► **Data Technology**  
1515 Centre Pointe Drive  
Milpitas, Calif. 95035  
(408) 942-4000

**Apple Computer, Inc.** has introduced the Apple Personal LaserWriter 300, which the company said is a compact and energy-efficient laser printer.

Weighing less than 15 pounds, the Personal LaserWriter 300 can print up to 4 page/min. The product offers 300 by 300 dot/in. resolution and has gray-scale printing capabilities that generate a variety of gray shades for sharper images.

Apple's TrueType font technology is incorporated, and Apple's Grayshare

printer software is used for ease of use. Personal LaserWriter 300 costs \$689.

► **Apple Computer**  
20525 Mariani Ave.  
Cupertino, Calif. 95014  
(408) 996-1010

### Software

**Benesoft** has released This Is My Computer Version 2.0, a software tool that creates a detailed printout of a user's computer system.

By pressing the letter "P," a user receives a map displaying configuration information, CMOS hard disk setup information, CONFIG.SYS, WIN.INI and SYSTEM.INI files, AUTOEXEC.BAT and a directory tree listing of the entire hard disk. The program can run under DOS and Windows; it costs \$12.99.

► **Benesoft**  
100 Aldworth Way  
Folsom, Calif. 95630  
(916) 983-2358

**Passport Designs, Inc.** has introduced Passport Producer Pro, real-time, interactive multimedia production software.

Improved graphics and text capabilities, path-based animation, interactivity, external devices control and video support are provided in this release.

The product offers a visually oriented "drag-and-drop" user interface called the "Cue Sheet" that enables users to build professional-quality interactive productions with maximum flexibility, the company said.

The recommended configuration for Passport Producer Pro is a Macintosh Quadra with 12M bytes of random-access memory.

The product costs \$1,495.

► **Passport Designs**  
100 Stone Pine Road  
Half Moon Bay, Calif. 94019  
(415) 726-0280

**E-Machines**, a division of SuperMac Technology, Inc., has introduced Futura II and Ultura, two families of 24-bit color graphics cards. Both products offer large-screen color with extended features. Cost: Futura II starts at \$499, and Ultura costs \$1,299. E-Machines, Sunnyvale, Calif. (408) 541-6100. ... **Avid Technology, Inc.** has introduced Release 2.0 for Media Suite Pro, a desktop video production system. Key features include new effects, an edit decision list output option and a 60-field option. Cost: \$9,995. Avid Technology, Tewksbury, Mass. (508) 640-6789.

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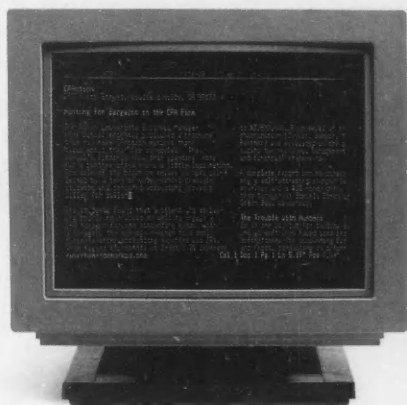


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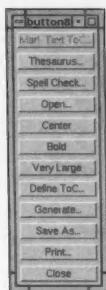
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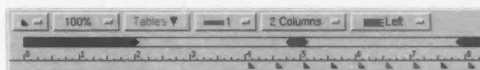
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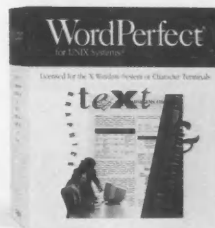
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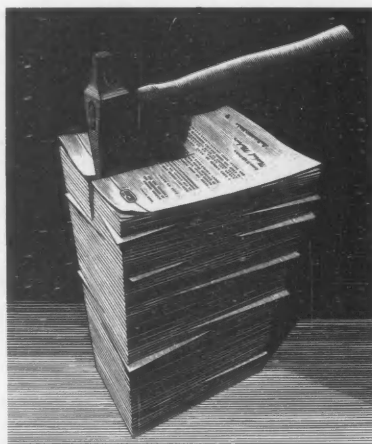
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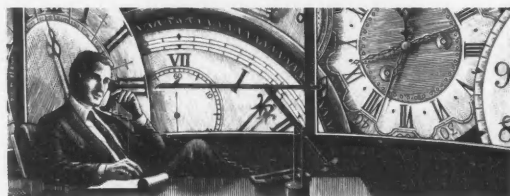
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# Workgroup Computing

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## Superservers

### NCR boxes take charge at CNA

By Michael Fitzgerald  
CHICAGO

The superserver market has developed slowly, but CNA Financial Corp. has put the big PC boxes at the core of its re-engineering project: It has purchased 20 NCR Corp. multiprocessors and plans to buy another 50 by year's end.

CNA built a superserver data center in its home office here as part of its strategic platform re-engineering initiative [CW, Aug. 2]. CNA's branch offices, which support the firm's coterie of independent insurance agents, connect to the servers in the center, which in turn connect to crucial corporate data on CNA's IBM mainframes.

The superserver data center has 20

NCR System 3000 superservers — 3410s, 3450s and 3550s running up to four processors. CNA created the server center as part of its effort to move its networks from IBM's defunct PC LAN Program (PCLP) network protocol to Novell, Inc.'s NetWare, though some of the superservers also run Unix.

Under PCLP, host connectivity was achieved by putting a 3270 emulation card in a PC server in each branch office. This server connected to

NCR boxes, page 56

#### Wall graffiti

CNA, the nation's eighth-largest insurer, began its move to distributed computing in 1987. John Lochow's re-engineering project began with a 30-foot wall that he papered from floor to ceiling with schematics diagramming the transition. It included roughly 100 projects.

## LAN saves TV network \$1M

Software licensing, maintenance costs drop in mainframe downsizing

By Michele Dostert  
VIRGINIA BEACH, VA.

The Christian Broadcasting Network (CBN) has completed a 2½-year downsizing project that it estimates will save the network more than \$900,000 a year.

The nonprofit religious broadcasting company downsized more than 35 applications — from studio scheduling to accounting software to contributor databases. CBN estimated the operational cost of downsizing to a PC-based local-area network at \$1 million, most of it spent on retraining mainframe programmers, programming tools and contract programming services.

"The capital equipment expenditure didn't actually cost us anything; we discovered that buying equipment for the LAN would actually cost us less than upgrading our mainframe would have," said Jim Funari, CBN's MIS director.

"We were forced off of the mainframe by the rigid, exorbitant pricing schedules charged by IBM and Computer Associates," said Paul Flanagan, CBN's vice president of information services, citing the general expense of host-based processing and fees vs. costs for LANs.



Paul Flanagan (left) and Jim Funari managed LAN move

"Moving to the LAN, our software licensing fees dropped from \$570,000 down to \$120,000 yearly," he said.

CBN's LAN supports more than 625 users and spans eight servers, running applications such as office productivity and personnel as well as the contributor database. It uses Novell, Inc.'s NetWare v3.11 as its operating system. Client PCs are mostly MS-DOS-based, though there are a few Windows systems. Users log in and choose applications via customized menus built with Saber Software, Inc.'s SaberMenu software. Clients are connected via thin Ethernet cable to a Fiber Distributed Data Interface backbone.

CBN recently moved its last and largest application, an 8G-byte database of contributors' records, off its Hitachi

Data Systems Corp. 9080 mainframe and over to its LAN. CBN now plans to sell that mainframe.

In addition to the \$450,000 savings in software licensing, CBN estimated that downsizing will save it \$110,000 in hardware maintenance and operations. "We won't need nearly as many people doing tape backup and the like," Flanagan explained.

Because CBN trimmed its staff via attrition throughout the project, the information systems department plans to cut only a few contractors and operations people from its payroll.

To move the contributor database down to the LAN, CBN programmers had to write a

database management/transaction processing engine to manage the Microsoft Corp. FoxPro database.

"Originally, we planned to use Sybase as the back-end DBMS; FoxPro wasn't designed for 8G-byte databases," Funari said. "We thought when Microsoft bought FoxPro they would make it work with Sybase, but we couldn't wait any longer, and we had done so much in FoxPro we just went ahead and built our own engine."

## Microsoft demos fax integration

By Michael Vizard  
REDMOND, WASH.

Microsoft Corp. recently demonstrated an implementation of its Windows at Work software running on a Ricoh Corp. fax machine and promised to integrate devices running Windows at Work with its peer-to-peer network services.

Separately, Microsoft announced that it has added wireless support to its remote mail client software.

"We weren't the first to announce a wireless client, but we are the first to ship it," said Mike Maples, executive vice president.

The integration of Windows at Work with Windows for Workgroups is particularly significant because Mi-

crosoft Chairman Bill Gates promised that it will allow users to exchange editable documents by fax transmission. Currently, users can send only bit-map images that cannot be edited across fax lines.

Windows at Work was designed to provide a graphical interface to office equipment. On the Ricoh fax, the software provided an interface to an icon that could send multiple faxes to a list of people, encrypt a fax for security purposes or program the fax machine to transmit at certain hours to take advantage of lower telephone rates.

By linking these devices to Windows for Workgroups, users will be able to control them through their PCs.

#### Three parts

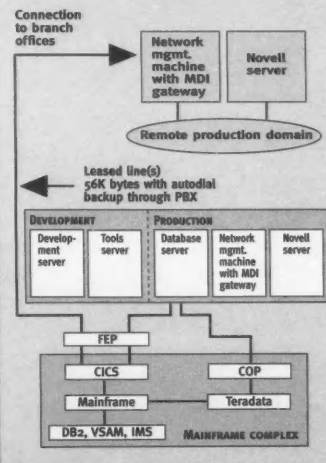
The CBN contributor database now resides on three 486/50-MHz Compaq Computer Corp. servers — one dedicated to transaction processing, one to the master data tables and a third to handle large selections and batch sweeps of the database. The transaction processing server uses a table-driven, list-directed process to route requests to the database itself; roll-back and roll-forward safeguards ensure data integrity in case of midtransaction failure.

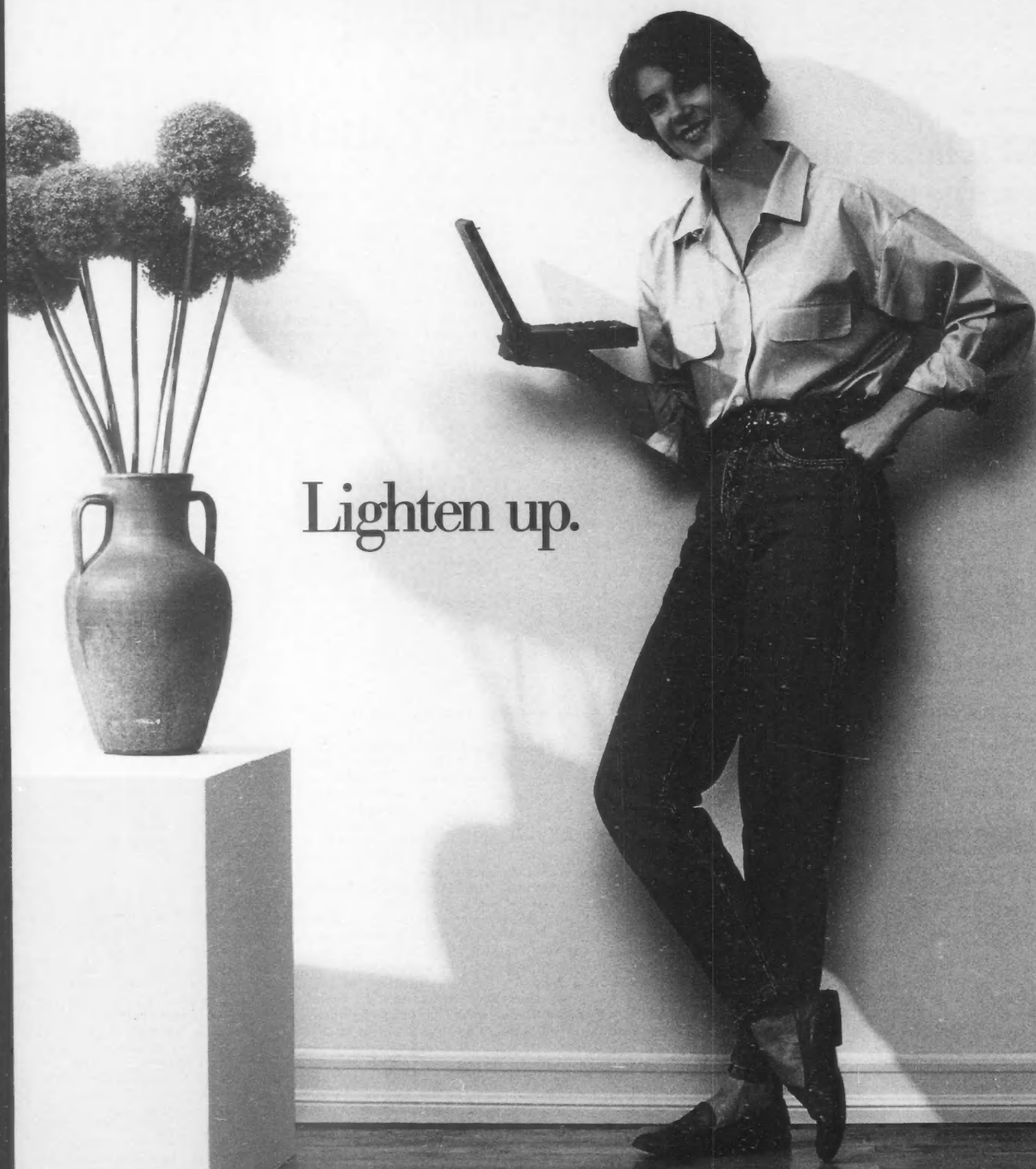
Including re-engineering time, the CBN staff completed the database project in 20 months. Funari attributed the speedy completion to a limit on the re-engineering stage. "When you move applications, you have to identify the changes that have the most payback to the users and do them but not get trapped in making every little change someone suggests," he said.

The CBN staff said they had no qualms about the reliability of their LAN platform. "We only tolerate 0.5% downtime in our 18-hour-a-day, six-day work week, and we've had no trouble meeting that," Flanagan said. He credited conservative engineering in the cable plant, frequent segmenting, mirrored servers and Simple Network Management Protocol-based network management, as well as a staff experienced in network maintenance, for that reliability.

#### Superservers at the center

CNA's superserver complex sits at the center of its information technology infrastructure





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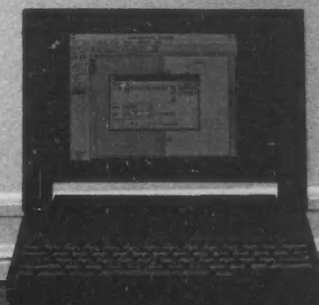
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### NCR boxes

CONTINUED FROM PAGE 53

the mainframe via a cluster controller, a kludgy process that prevented host and local sessions from running on the same server.

The server center has also helped John Lochow, vice president of systems, retain productive staff members. Since the center was designed like a mainframe center with customized cases and monitoring data, CNA took employees who had tended master mainframe consoles and retrained them to handle the server data center. The superservers also connect the roughly 5,000 PCs in the home office with the mainframe, running data over a fiber-optic backbone.

Lochow said he has bigger plans for the NCR multiprocessors. In each of its 48 major branches the company wants to install a 3450 that has a single Pentium chip and runs Sybase, Inc.'s Sybase database. The NCR box would tie into IBM PC Co.'s Personal System/2 Model 95 that acts as the branch server.

This configuration, now in pilot stage, would give CNA branches "the ability to go to the central databases on the mainframes and query against that data, gaining instant access to it," Lochow said. "Currently, they can look up any piece of data they want, but to get a query or a report they have to go to the development community to write it."

#### Long-term measure

While putting the NCR boxes into the branches has a solid justification today, Lochow is betting it is a good move for the future as well. He said he thinks Novell will eventually meld NetWare with Unix, and CNA will then add processors to the NCR boxes to handle its server needs in the branch offices.

"The NCR is a design point. It gives us something we don't have right now but also offers us a potential next step," Lochow said. He said NCR's strong statement of direction concerning Novell and Unix and open systems helped cinch the decision not to buy IBM's Server 295 superservers, which, for instance, did not include Novell support until this year.

"NCR stated their architecture and desire for interoperability and coexistence with other architectures better than IBM," Lochow said. "IBM's our primary vendor, but we're doing this with our eyes open. [While] IBM is improving at [communicating], it needs to get better."

### DG adds tools for Aviion servers

By Craig Stedman  
WESTBORO, MASS.

Data General Corp. is developing distributed document management and workflow capabilities for integration into Uniplex Ltd.'s OnGo office groupware suite, which DG recently introduced for use with its Aviion line of Unix servers.

William Zastrow, DG vice president of imaging and office systems, said the enhancements should be added to the company's AV OnGo offering this fall. The document management tools will also be built directly into Uniplex's own OnGo code in 1994, he added.

Ronni Marshak, an analyst at the Patricia Seybold Group in Boston, said DG

appears to be trying to fill holes left in OnGo at the enterprise level. Uniplex has been "derailed a bit" in its own development work on the product, she said.

DG will ship AV OnGo for Motif-based clients this month. Windows client support, which it also developed, should be added in the fourth quarter. Zastrow said DG also plans to market WordPerfect Corp.'s rival WordPerfect Office 4.0 software when that gets Unix support next year.

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Commentary  
Franco Vitaliano

### Pumping up PC iron

The forthcoming 100+ MIPS "PCs" based on Pentium, Mips and Alpha chips are going to forever transform your organization. When networked together, the collective power of just several of these pumped-up PC systems will surpass even your biggest and mightiest hunk of mainframe iron. Soon you will be able to buy these "PCs-on-steroids" for less than \$5,000. In short, the era of the "distributed PC mainframe" has arrived.

To ignore this magnum load of collec-

tive computer power is to doom your organization to strategic and competitive obsolescence. To take advantage of this opportunity, your downsizing mind-set needs to expand well beyond embracing just client/server SQL. You must now consider the strategic implications of bringing unheard-of amounts of cheap computer power straight into your departmental LANs.

But how do you implement and manage this newfound departmental power

with the same level of control and security as your traditional big iron? You could, for example, dedicate a cluster of low-cost machines as distributed processing farms. If so, using Microsoft's Windows NT or a version of Unix such as Novell's UnixWare is just fine.

Alternatively, you might get a little antsy at the thought of a 100-or-so-MIPS machine sitting there while someone peeks away at his Pentium PC word processor. In that case, multiuser Unix on the desktop makes much more sense as a way of sharing those surplus cycles.

You will also want to carefully think about how to deploy your newly downsized computer servers. You can go the one-job/one-box route. Or maybe you can carve up one big mainframe job to execute in network parallel across several powerful PCs at once. A network message-passing approach such as Parallel Virtual Machine has an easy-to-implement C library that enables heterogeneous networked machines to cooperate in a loosely coupled way.

Conversely, forget about remote procedure calls for network parallel work, as they are inherently synchronous — i.e., the overall network computation can hang while one node blocks. Ditto, forget network-shared memory schemes: As you add more nodes, they will quickly saturate your network bandwidth.

#### New administration

Once you have downsized your big mainframe jobs, you have to administer the new systems. You will absolutely need some type of software to automatically ferret out idle network CPU cycles, and also a methodology for fairly allocating these resources to prevent a single greedy power user from sucking up every network cycle in sight. You will also need high-level systems managers to supervise and monitor the applications on your distributed PC mainframe.

Here, the new SNMP-2 protocol will probably come in just as handy for monitoring distributed applications as for managing network devices. Likewise, the greatly enhanced security features of SNMP-2 can surely be extended to include applications.

Or consider using the new RSA-based digital signature security systems that are now coming to market with support from Novell, Lotus and others. Besides securing documents and E-mail, digital signatures can be used for authenticating users when logging on to systems.

Lastly, your distributed PC mainframes most certainly need distributed file servers such as NetWare 4.0, NT Advanced Server or the latest Banyan Vines release. The perfect operations downsizing marriage will come about by mating your distributed PC mainframe with one of these network operating systems and several gigabytes of fast, cheap RAID.

So, as the saying goes with respect to this sudden abundance of cheap new cycles: Use it or lose it.

Vitaliano is a Boston-based writer specializing in distributed computing.

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# Automation preserves jobs at manufacturer

By Thomas Hoffman  
ASHLAND CITY, TENN.

Technophobes will argue that automation has stolen thousands of jobs from U.S. manufacturing workers in recent years. But unlike many of its peers, State Industries, Inc., a \$350 million water heater manufacturer, has managed to retain — and even create — jobs through the savvy use of technology, including information systems.

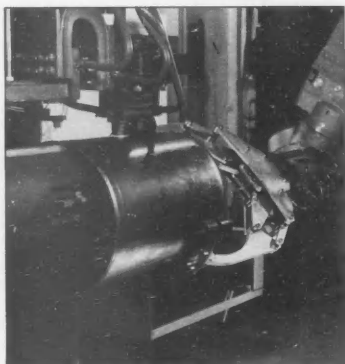
By 1985, most of State Industries' competitors — including A. O. Smith Corp. and Rheem Manufacturing Co. — had moved their manufacturing plants to Mexico, where the labor rate at that time was approximately 75 cents an hour, or one-tenth the cost of labor here. To remain competitive, State Industries had two choices: move its manufacturing plant south of the border and lose most of its 2,000 employees or automate its U.S. operations.

To take the stateside option, the company would have to design a new-age water heater because its existing models did not lend themselves to automated production.

So State Industries developed a leading-edge product and kept its work force intact. Almost four years ago, the company began manufacturing the Duron water heater. Unlike older models, the Duron is made from two, rather than three,

steel pieces and is lined with a plastic composite material. The single-weld design and composite liner also make the Duron tank virtually leak-proof because sediment cannot reach and corrode the welded steel.

On the Duron manufacturing line, eight workers oversee the robots and other automated devices that manufac-



Robots produce a new type of water heater and receive their marching orders from an RDBMS

ture 1,200 tanks per eight-hour shift. That compares favorably to the production lines for the older-style glass-lined and porcelain tanks, which require 75 employees to manufacture 1,000 tanks in the same period.

The Duron robotics and automated de-

vices receive information from an NCR Corp. 3450 multiprocessing server. The server, installed last month, runs on an Informix Software, Inc. OnLine 5.0 Unix relational database management system.

The server connects to an IBM 3090 mainframe over a 3270 link to receive a product requirements file and then uses Informix database applications to schedule production. The RDBMS downloads instructions to the robots, laser welders and other devices over an NCR-designed fiber-optic local-area network. The robots and automated devices receive instructions via RS-232 ports.

## Towers out

The NCR 3450 server replaced two NCR Tower 750 machines. A single server has supplanted the minicomputers for several reasons, according to Michael Garrison, State Industries' manufacturing and industrial engineering manager.

"Because the NCR 3000s [made obsolete] the Towers and since NCR said there would be no further development of the Towers, it seemed logical," he said.

The single server will support a second Duron production line that went live

Aug. 1. Annual maintenance for the server will cost State Industries about \$10,000, compared with \$16,000 for the two Tower systems, Garrison said. But

he said those savings did not drive the decision to scrap the Towers. "It's easier to write programs for one machine instead of two, not to mention the administrative benefits," Garrison said.

Since the company began manufacturing the Duron tanks in October 1989, State Industries has shifted most of its line workers to manufacture the older-design tanks. It continues to produce as many of these as it did five years ago. In fact, the company has added 100 employees to its work force since then.

And though State Industries will phase out production of its glass-lined residential tanks, Garrison said, it will retrain its line workers to avoid layoffs.

Garrison insisted that the work force would remain intact, except for attrition and retirement. "My primary function has been to install automated equipment, and in my 17 years here, we've never laid anybody off due to automation, and we don't intend to," he said. "Technology in and of itself does not have to reduce jobs."

## ON SITE

### State Industries, Inc.

Ashland City, Tenn.

**Challenge:** To keep jobs in the U.S. by automating production of a new line of water heaters.

**Technology:** NCR 3450 multiprocessing servers, robots and Informix RDBMS.

**Results:** The new production line runs with only eight workers.

## SNMP added to Ethernet adapters

By Lynda Radosevich

A recent round of vendor innovations added speed, easier installation and Simple Network Management Protocol (SNMP) capabilities to cheap Ethernet adapter cards.

The improvements let information systems managers eke ever more out of Ethernet technology. For instance, SNMP capabilities in new Ethernet cards from Ungermann-Bass, Inc. let network managers at the Physicians Health Plan of North Carolina in Greensboro detect lost network connections in file servers, gateways and print servers before end users "light up the phone," said MIS manager Phil Kurtiak.

### Added adapters

Recent developments include the following:

- UB announced an SNMP agent for its MasterLAN line of Ethernet adapters. Including the management on the adapter rather than in the host frees up to 40K bytes of host memory, according to a company spokesperson. The cards cost \$375, and customers can re-

ceive free upgrades.

- Standard Microsystems Corp. (SMC) in Hauppauge, N.Y., announced a line of 16-bit Ethernet adapters. Using a technique that immediately forwards packets of data before they are fully received into the adapter's buffer, SMC reduces data transfer times. However, critics of the \$129 card said that method eliminates error-checking functions and could fail to detect bad packets.

- Accton Technology Corp. said it will ship this month a line of adapters, priced at \$109 per card, that increase performance without eliminating error checking. Accton said its acceleration method increases performance by incorporating the network controller, bus interface and transceiver into a single chip.

- Kingston Technology Corp. in Fountain Valley, Calif., shipped a 32-bit Ethernet card for Extended Industry Standard Architecture bus computers. The \$250 card uses a technique called Direct Bus Mastering to transfer data directly to and from the host system memory and improve operating speed.

Lotus Development Corp. has announced the availability of CC-Mail for OS/2 Workplace Shell Version 1.0, an object-oriented version of the company's electronic-mail program.

The version features multitasking capabilities and an object-oriented file management system. The E-mail environment includes a new graphical user interface based on the Workplace Shell; a draft folder for storing messages in progress and a trash folder for retrieving deleted messages; and spell checking.

A 10-user pack costs \$345; a 25-user pack is \$845; and a 100-user pack costs \$3,295.

### ► Lotus

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Cambridge, Mass. 02142  
(617) 577-8500

Network Communications Corp. (NCC) has released software enhancements for Version 4.1 of the LANalyzer Network Analyzer, NCC's local-area network diagnostic software.

Running up to six times faster than Version 3.11A, LANalyzer 4.1 is said to be the first and only analyzer capable of testing and analyzing NetWare 4.0, according to the company.

Other features include an automatic name generator, post capturing filtering and enhanced protocol decodes. Prices start at \$1,350.

### ► Network Communications

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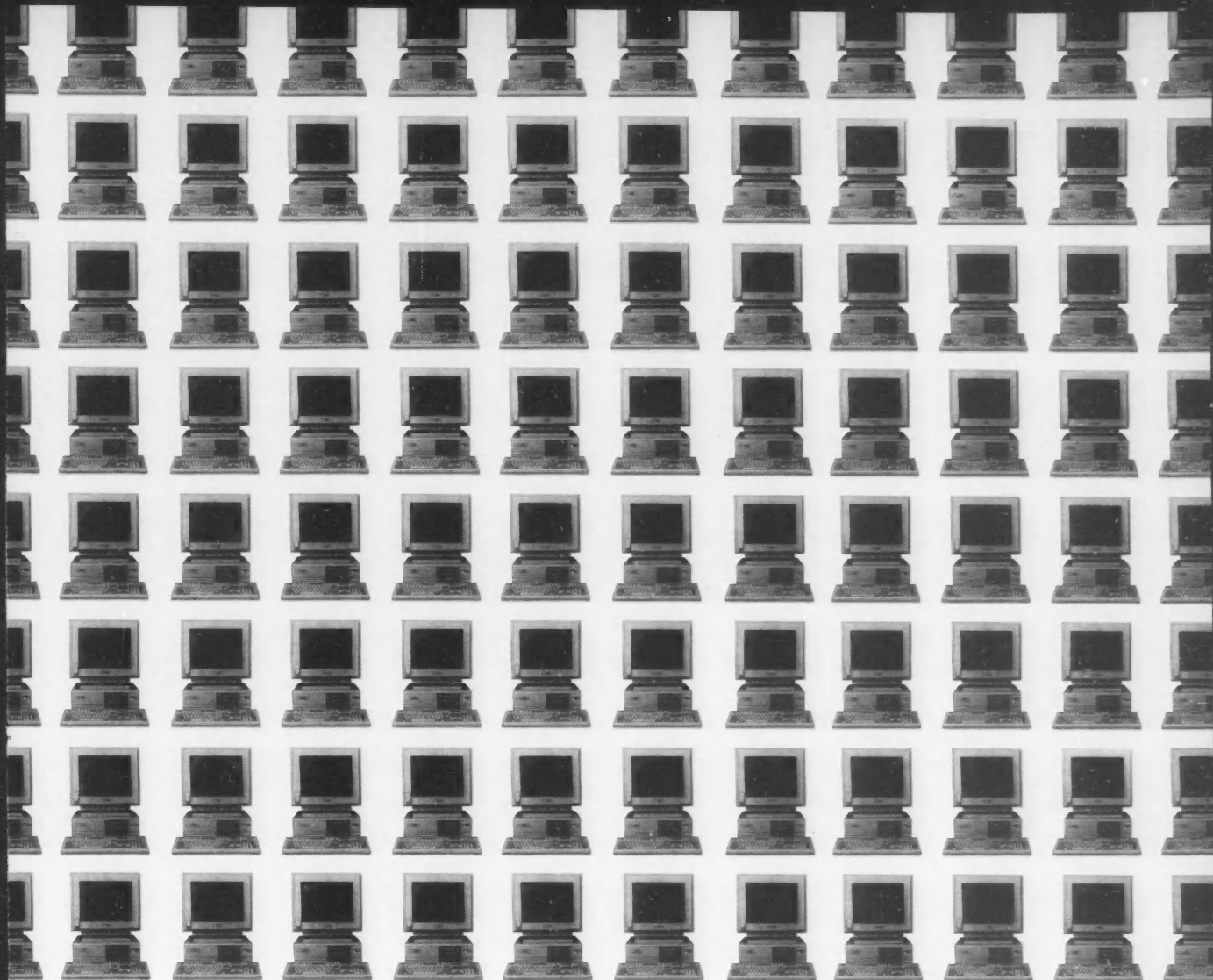
Bloomington, Minn. 55437  
(612) 844-0584

## Product shorts

Lawson Software has announced the Open Enterprise Release, a client/server version of the Lawson Human Resources System. The system comprises Payroll, Personnel Administration and Flexible Benefits applications and runs on an assortment of client systems, hardware platforms and relational databases. Cost: Pricing begins at \$24,000. Lawson Software, Minneapolis, Minn., (612) 379-2633.

JetForm Corp. has announced plans to ship a Macintosh version of its JetForm for E-Mail, a multiplatform, intelligent forms fill-in product that includes a set of work-flow tools and that can be used with standard electronic-mail systems. The first three Unix platforms it will support are Sun Microsystems, Inc.'s OpenLook, IBM's RISC System/6000 and Hewlett-Packard Co.'s HP 9000. Cost: ranges from \$495 to \$1,495. JetForm, Waltham, Mass., (617) 594-3026.

CARP Systems International has announced APS:Enterprise, a redesigned version of its Advanced Planning System that operates on Unix workstations. The product now offers an object-oriented, client/server-based management decision support system for logistics and business planning. A Windows-based version called APS:Solo was also introduced. Cost: An APS:Enterprise license starts at \$95,000; APS:Solo starts at \$25,000. CARP Systems International, Lexington, Mass., (617) 862-6708.



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## Asynchronous Transfer Mode

### IBM fills out plans for moving networks to ATM

By Joanie M. Wexler  
WHITE PLAINS, N.Y.

Adding a splash of context to the high-level Asynchronous Transfer Mode (ATM) blueprint it laid on the table last month [CW, July 19], IBM has provided some details about how it will migrate users to enterprise networks destined to one day include ATM.

The ATM plans complement IBM's broader scheme for transitioning Systems Network Architecture (SNA) shops to distributed, high-speed computer networks, analysts said.

IBM views frame relay as a functional and technical stepping-stone to ATM networks; businesses can connect their gear to ATM local-area networks via frame relay with a mere software upgrade, said Bill Conklin, IBM director of networking subsystems. So the company plans to add frame-relay support throughout the next year to the 3172, 3174, Application System/400 and PC-based DOS bridge.

"ATM is the end result, but most customers won't be there for years," said David Passmore, vice president and service director at Gartner Group, Inc. in Stamford, Conn. "What will be offered by carriers will primarily be frame relay."

For the near term, Passmore said, users can put a frame-relay interface on their equipment, then just change the interface as ATM extends from the carrier backbone to their premises.

## Role-playing

Meanwhile, IBM has mapped out the following roles for its existing SNA-oriented gear in tomorrow's networks:

- **The 3172 cluster controller** will gain a frame-relay interface within the month and eventually get interfaces into high-speed local and remote networks such as ATM, T3 (45M bit/sec.) and Switched Multimegabit Data Service. OS/2 Communications Manager software will be integrated into the 3172 this month.
- **The 3174 data concentrator** will gain increased connection speeds from today's 64K bit/sec. up to 128K to 256K bit/sec. via new adapters. It will also get frame-relay and Synchronous Data Link Control interfaces in the form of software upgrades to the adapters.
- **The 3745 front-end processor** is a candidate for the 25M bit/sec. ATM under development at IBM for local connections only.

Conklin also said IBM will eventually allow users to choose where they want their multiprotocol routing to take place: in the smart wiring hub, a stand-alone router or in IBM's Transport Network Node, a wide-area ATM switch due out in late 1994.

Meanwhile, he indicated that IBM's 6611 router would not be the last router product from the company; the device is not a candidate for an ATM interface.

## 4.0 put to the test

Grocery chain benefits from early NetWare move

By Elisabeth Horwitt  
TORONTO

National Grocers Co. is not one of those wary firms that automatically holds off buying any major new release that ends in a ".0."

The grocery chain became a beta-test user and then an early implementer of Novell's NetWare 4.0 because "the bumps and glitches you get with new releases are minor compared to what they give you in terms of serving the customer," said Robin McCubbin, network planning analyst at the company. The rollout of the new version is expected to be complete by October.

Indeed, the grocery store chain already has some experience on the bleeding edge of Novell's network operating system: "We put in 3.0 when it first came out because we needed to get past that 100 connections [per server limitation]," McCubbin said. "Otherwise, we [would have] had to put in a second server."

## Easy decision

The decision to implement NetWare 4.0 was basically a no-brainer, according

to McCubbin. One feature of the new version that was important to the grocery chain was the ability for network administrators and users to access a group of servers with one log-in, instead of one server at a time. "We have 500 users in this building alone and three servers, so for them to get at all resources with one log-in was a major plus."

In addition, NetWare 4.0's disk compression and hierarchical storage management were important to National Grocers as a way to "take the pressure off our disk requirements," McCubbin said. The firm's servers now hold 3G bytes or more, and the new features save it from having to migrate to 4G bytes.

## Easier implementation

So far, McCubbin and his group have found implementing NetWare 4.0 a lot less troublesome than commonly reported. "A lot of people say the global directory takes a while to get hold of," McCubbin said.

His group did spend two weeks getting up to speed on the NetWare Directory Services and its tree-like directory

NetWare 4.0, page 63

## Migratory methods

**NetWare 4.0**  
MIGRATION

The rubber meets the road: Step-by-step migration to NetWare 4.0:

National Grocers plans to migrate its servers from NetWare v3.11 to Version 4.0 over three to four weekends. "We recognize that there will be some bumps [during the transition], so we plan to prepare our customer base in lunch-hour sessions," said Robin McCubbin, network planning analyst at the company.

The process will be as follows:

- **Step one:** Get the network drivers on the workstations.
- **Step two:** Pop up a new NetWare 4.0 server and get the data from a 3.11 server on it.
- **Step three:** Shut down the 3.11 server. People can log on to the new server that Monday, ideally without noticing any problems.

—Elisabeth Horwitt

## Novell unveils host/LAN control

By Michele Dostert  
PROVO, UTAH

Novell, Inc. has unfurled software that will allow users of its NetWare for SAA product to monitor, maintain and control NetWare-to-IBM host sessions from the same console that oversees the rest of their interconnected local-area networks.

The product, called NetWare for SAA Services Manager 2.0, is an enhanced version of NetWare Communications Services Manager, a set of NetWare for SAA management utilities that Novell released in February.

The name has been changed to reflect the product's incorporation into Novell's NetWare Management System (NMS), a graphical user interface-based network management platform based on Windows. NMS was designed to allow users to automatically map, monitor, manage and control local or remote network devices and servers.

## On the map

NetWare for SAA servers will now appear as icons on the NMS console map, with their status easily accessible. Customers can also view NetWare for SAA alerts in the NMS Alarm Monitor window. "It is vitally important that network managers know who their mainframe users are, what their network address is, where their



## Popularity contest

NetWare-to-IBM host connectivity software appears to be a popular tool; Novell claims to have sold more than 35,000 server licenses of its NetWare for SAA product in the last year.

## Key points

### NetWare for SAA SERVICES MANAGER 2.0

- Integrated with Novell's NetWare management system.
- Administrators can centrally monitor, manage and control remote NetWare-to-IBM host sessions.
- GUI gives point-and-click access to NetWare for SAA server status, statistics.
- Alerts can be received via NMS Alarm Monitor.

mainframe connection server is," said Bernard Harguindegay, Novell's product manager for NetWare for SAA. "NetWare for SAA Services Manager provides a single, centralized point of management and control over remote LAN-to-host connections," he said.

NetWare for SAA users, especially those with remote sites, said they were pleased with the product. "We have NetWare for SAA installed in our branch offices; now, we can use the NetWare Management System installed at our central site to easily troubleshoot and manage all of those remote connections," said Clem Bowen, a systems analyst at Buck Consultants, an employee benefits consulting firm in New York.

Novell said NetWare for SAA Services Manager 2.0 is now shipping at a suggested list price of \$3,495. It comes bundled with a runtime version of NMS.

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## Applications offer central net security

By James Daly

As any network security administrator can tell you, the distributed functionality provided by any client/server setup also means you distribute your points of vulnerability. Fortunately, a pair of new applications from PC Guardian and Trend Micro Devices, Inc. were designed to provide centralized security control for network administrators.

San Rafael, Calif.-based PC Guardian has just announced an upgrade to its Data Security security package that includes the Novell, Inc. Interface Module. The added component provides both centralized control of workstation access and a single log-in capability to the workstation and server, PC Guardian officials said.

In recent years, security personnel have faced the Sisyphean task of providing the same quality of service to more and more networked users. "As our LANs have grown, so has the complexity of their administration," said Mark Caduc, a security analyst and Interface Module beta-test user at Air Canada in Montreal. "We still have the same number of administrators, but now they have a lot more to manage."

The module works by allowing the workstation's access control functions to be managed and controlled by the Novell NetWare Syscon utility. When the workstation boots, users enter their Novell user name and password. Once they gain access, they can then log in to the network at any time without having to re-enter their user name and password. As a result, users do not need to remember multiple user names or passwords.

The workstation access control func-

tions that are controlled and administered from the Syscon utility also enhance security by demanding periodic password changes and a minimum password length.

In addition, the system administrator can manage all access control functions for the network from a remote location using a single interface and program provided by the Syscon utility.

The Novell Interface Module continually synchronizes the user name and password on the workstation with the user name and password on the network. If the network is down or not accessed, the user is still required to enter a valid NetWare user name and password to gain access to the workstation.

The suggested retail price of Data Security Plus with the Novell interface is \$124.95.

In addition to providing centralized security control, the StationLock LANPack from Torrance, Calif.-based Trend Micro offers virus protection, access control, recovery control and encryption.

StationLock's NetWare Loadable Module server component allows a network administrator to set the configuration for each user or group of users, assigning node numbers and machine name relationships for access control, Trend Micro officials said.

The application also contains its own read-only memory BIOS, called X-DOS, which takes control of the workstation system prior to loading any operating system, thereby preventing all possible intrusions.

StationLock LANPack is scheduled for release in the fourth quarter. Pricing will be \$99 per workstation and \$240 for the server component.



### Briefs

#### ATM cards on way

Network Peripherals, Inc. and Syn-Optics Communications, Inc. have agreed to develop adapter cards for Asynchronous Transfer Mode networks. Network Peripherals plans to deliver the cards by January 1994 for all cable types. Pricing was not announced.

#### Unix support

ProTools, Inc., based in Beaverton, Ore., has announced Unix support for its network analysis product, Foundation Manager. Availability is slated for the fourth quarter. The Unix version will be integrated with Ungermann-Bass, Inc.'s NetDirector network management platform.

#### Concord enhances monitor

Concord Communications, Inc. has

added a Backup Link feature to its Trakker internetworking monitor, which is said to use out-of-band signaling to give users access to Trakker network management information—even during a failure of the local-area network where a given Trakker workstation resides.

#### LAN monitoring program

The Certified Network Expert organization founded by Network General Corp. and Hewlett-Packard Co. recently began registration for network managers who want to be certified for specific types of LAN monitoring tools and skills. For Ethernet and Token Ring, the examination is \$395.

The two vendors said they have received more than 1,000 calls from network managers and technicians. Companies including the AG Group, Inc., Microtest, Inc. and Wandel & Goltermann Technologies, Inc. recently joined the program.

## Wireless nets not all alike

Carriers diverge in coverage, capacity, design

By Joanie M. Wexler  
LEXINGTON, KY.

Information planners often do not care how a technology works as long as it does work. However, understanding an architectural design can sometimes help customers select alternatives more attuned to their applications.

This is especially true in choosing a wireless telecommunications service, as today's network-specific wireless modems make it difficult to change

carriers. And wireless network service providers have different strengths, reflected in their network designs.

Ardis, for instance, employs a transmission scheme optimized for reliable in-building coverage, while packet competitor RAM Mobile Data and cellular carriers focus on network capacity.

Ardis' aim is to deliver data deep within buildings. Because steel walls and other obstacles can derail wireless signals, Ardis increases the likelihood that a given transmission will reach its destination, Tom Berger, Ardis' vice president of radio network and product technology, explained during a recent conference here.

The network does this by transmitting signals to multiple base stations — what analyst Rob Rich at Dataquest, Inc. in Framingham, Mass., called the "brute force" method of building reliability into

wireless networks. Showering base stations with messages simply increases the odds of maintaining a connection.

RAM Mobile Data and the cellular carriers, on the other hand, send a given transmission to just one base station. This could lessen a signal's chances of being picked up, but it increases overall

network capacity by reducing broadcast traffic.

A longer-term issue with the Ardis network is that, unlike RAM Mobile Data, there is no guarantee the company will be able to add

bandwidth down the road. One day it will have to depend on existing spectrum licenses to "sell" capacity to Ardis, Berger acknowledged.

RAM Mobile Data was able to license directly from the Federal Communications Commission a significantly larger chunk of spectrum, which it can deploy as demand warrants.

Coveragewise, while the Cellular Digital Packet Data (CDPD) group has released Version 1.0 of its protocol for sending data over the widespread analog cellular network, it could take two years for CDPD coverage to equal that of the packet networks [CW, July, 26].

Andrew Seybold, editor of the "Outlook on Mobile Computing" newsletter, explained that McCaw Cellular Communications, Inc. plans to implement CDPD on just one channel out of six per cell, and only on certain cells by June of next year.

According to Ardis, 80% of its customers are in the field service or logistics business.

## NetWare 4.0

CONTINUED FROM PAGE 61

structure. "Initially it was tough; if you try to take what you have [with v3.11] and manipulate around the differences, you will be in trouble."

Particularly challenging for the group was how to set up a directory structure that would give users easy access to whatever resources they wanted in the enterprise, without having to keep shifting from one directory "domain" to another, McCubbin said.

The approach settled on was to fit "the largest unit of your organization you can" into one domain. Users could then access one another's resources without shifting to a different organizational context, as defined by the directory.

The idea was to avoid taking up network administrators' time with updating the directory to reflect users' moves and changes between divisions and departments, McCubbin said. Someone makes a departmental move about once a day at any 1,000-person division within National Grocers.

The structure chosen by the chain comes with a caveat, however: Users must take responsibility for controlling who accesses their files. McCubbin's group is teaching users how to dynami-

cally allocate access to their files and create subdirectories.

McCubbin ascribed his company's comparative lack of problems with NetWare 4.0 to the fact that it has pretty much gone by the book in implementing the system.

"We don't try to do wild things with scripts of network configurations in order to get an extra .03% in performance; it's when people do that that they get in trouble," he said.

### Support needs

The one area that Novell needs to work on with its new enterprise-oriented system is disseminating information and support to users, McCubbin said.

"When you buy software for your IBM mainframe, once you pay the license your updates, changes and patches come automatically to your desk. The account manager assigned to you comes in once a month."

That level of support does not yet exist in Novell's organization, even for major accounts such as National Grocers, which runs a 1,000-station Novell network, McCubbin said.

However, Novell said it is working on getting its support up to the level that goes with an enterprise networking vendor, he added. "And they are getting some cross-pollination from their partnership with IBM."

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Hewlett-Packard Co. has introduced two Windows-based software packages for managing local-area networks.

According to the company, HP's OpenView Workgroup Manager/Windows and HP OpenView Interconnect Manager/Windows were designed to reduce the effort and expense required to manage LANs as they expand.

The HP OpenView Workgroup Manager/Windows offers workgroup-level network management for PCs, printers, hubs and workstations. It can automatically discover what is on the network and draw a hierarchical network map, displaying the network topology, the company said.

A superset of the capabilities of Workgroup Manager is provided with Interconnect Manager, maintaining the same user interface.

Interconnect Manager performs router configuration via a Telnet capability, monitors and controls bridges and routers, and provides real-time trend analysis.

HP 28686E OpenView Workgroup Manager/Windows costs \$2,000, and HP 27256E OpenView Interconnect Manager/Windows costs \$4,000.

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Novadigm, Inc. has announced the Novadigm Enterprise Desktop Manager (EDM), a fully integrated systems management solution for managing the deployment and distribution of enterprise applications, including 3270, client/server and frontware on the desktop.

EDM consists of three distributed components. EDM:Manager controls desktop configurations, enterprise application components and policy relationships in a central database repository. Enterprise management functions are provided by EDM:Client, an enterprise desktop-resident facility that works on the desktop in conjunction with EDM:Manager. EDM:Administrator is a systems management facility that enables users to configure the EDM:Manager and distribute management services to authorized desktops, the company reported.

EDM costs \$100 per user, \$1,000 per administrator and \$20,000 for the enterprise server.

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Attachmate Corp. has announced Extra for OS/2 Release 1.0, a desktop-to-host product.

The new software connects OS/2-based PCs to IBM mainframes and is fully compatible with IBM's latest OS/2 2.1.

The company said it provides a workplace shell user interface and that Extra for OS/2 allows up to 26 simultaneous host sessions and supports 3270 screen sizes up to 27 lines by 132 characters.

The product was designed for client/host processing and can be configured to connect to the host in an assortment of ways, such as local-area network gateways, Token Ring, Ethernet 802.2 connections and 3270 coax links.

Extra for OS/2 costs \$425.

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Jeffrey N. Fritz

## Falling for a technology



There is strange sociology in enterprise networking. I don't know if the implementation of an enterprise network has ever been studied,

but it would make a great thesis topic. Here is the premise: Every new enterprise networking technology goes through a sociological cycle that is not unlike dating. It's no different from what happens when you catch the eye of someone interesting across the dance floor.

The relationship has six phases:

• **Phase one:** Eyes meet for the first time. This is the introduction of the new technology. Four-color product literature appears. Marketing leaks product specifications to the media and certain key users. The specifications astound the technology's own designers. Standards bodies, attempting to lead the implementation, begin the standards development.

• **Phase two:** The couple dances and begins to fall in love. This is the hype phase. The idea is to create excitement by pouring out semitruths and outright distortions disguised as facts. Hype flows freely. It flows from marketers, from early adopters and from the media. The sales force is deployed to promote the vaporware and secure a leading image in the marketplace. Standards bodies are in a fracas.

• **Phase three:** They look closely at each other. "Oh my gosh! He/she has zits!" Phase three is referred to as the panic phase. Alarms are sounded by rival technology vendors that fear being shut out by a perceived rush to the new technology. The rivals have fallen victim to the hype issued in phase two. Alarms are sounded by never-to-be-users (so they think), who fear losing out if the new technology makes it.

Alarms also come from the media, who are listening to never-to-be-users and rival technology vendors. Early adopters read the negative press and, fearing they backed the wrong horse, become defensive and lose confidence. The product appears in test deployments. Standards bodies are still in a fracas.

• **Phase four:** Prophets of doom predict the relationship will never last. Phase four is the death knell phase. Rival ven-

dors announce that newer technologies (which, of course, they will develop) signal the death of the technology. The media reports the technology will never make it. Potential users are shaken and become unsure of their implementation strategies. (Interestingly, early adopters ignore phase four entirely.) Early products hit the market. Standards bodies are still in a fracas.

• **Phase five:** I'll take him/her, zits and all. Phase five is the boredom/realism phase. The media is bored with the technology and has stopped reporting on it. The sales force is bored with the technology (but still does not understand it). Users finally realize the technology may not be perfect (as initially advertised), but it does fill a need. Standards bodies become bored and move on to other technologies. Standards are still not set.

• **Phase six:** The couple becomes as comfortable as old shoes. Phase six is the product phase. During this phase, the product and its related products are available off the shelf. (It is easy to tell when a product or service has reached phase six: You can buy it at Radio Shack.)

Here is how I see today's network technology lineup. ATM has the honor of being both in phase one and phase two, SMDS is in phase three, FDDI shares phase four with frame relay, and ISDN is in phase five. Only modems have reached the coveted phase six.

If you want to watch the cycle, pick a young technology and follow it. Watch ATM, for example. Listen carefully to the vendors that will sell it and those that think they won't. Read the media coverage as the technology progresses through each of the six phases. Pay particular attention to coverage of early adopters and antagonists. Watch carefully and you'll see the cycle. It happens every time and is fun to watch.

Although entertaining, the new technology dance does have a dark side. There is a tendency to be sold on what the marketers want, not on what the user needs. The user can be misled into avoiding certain technologies or falling into others. Armed with a good dose of reality, users can protect themselves from the technology dance. The key is to separate fiction from the reality of the product or service.

True love in a marriage occurs when both partners realize they married a person, not a fantasy. The same holds true in the new technology dance. Fall in love with what the product or service can actually do for your enterprise, not what the color brochures and marketers lead you to believe it can do.

The most amazing part of the technology dance is that it is cyclical. So even as we begin the dance with ATM, you can be sure that deep inside some lab somewhere, the technologists are hard at work creating tomorrow's next new love. You and I don't know anything about it yet, but, believe me, we soon will.

Fritz is a data communications analyst at West Virginia University in Morgantown, W. Va.

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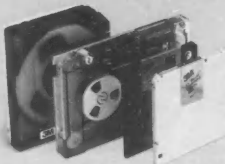


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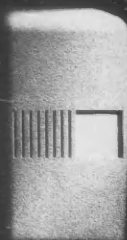
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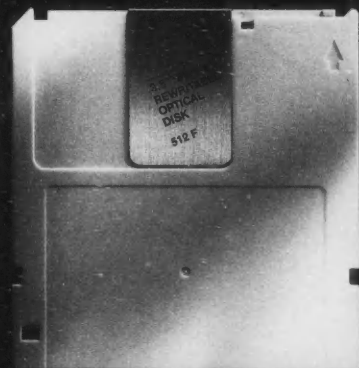
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*Reliability*

## U.N. group globalizes data modeling

By Thomas Hoffman  
NEW YORK

Promoting the social and economic development of Third World nations is a noble cause. But carrying out that mission from more than 100 points around the globe is no easy task.

Such is the challenge facing the United Nations Development Programme (UNDP). UNDP is the world's largest multilateral grant development assistance organization: It supports 6,000 projects in 174 developing countries at any given time. The funding agency acts as the chief administrator of \$1.7 billion for projects aimed at helping underdeveloped countries achieve self-reliance.

Of the UNDP's 6,000 staff members, 80%, or 4,800, are located in the field.

Over the years, UNDP has helped establish systems in each of its 120 field offices. Most of the 3,000 desktop devices used in the field are IBM-compatible PCs



The UNDP New York staff (l to r): Renjay Yin, Tullie Ch'ien Eng, Malcolm Chisholm, Hossam Galal and David Joel

that run Cobol-based financial applications. The field offices administer funding for projects that are handled by U.N. agencies such as the World Health Organization.

But most of the UNDP field office systems are independent of one another and do not communicate well, according to Malcolm Chisholm, manager of data administration and systems development.

To better integrate these systems while reducing redundant data entry, the UNDP last year embarked on a project to develop a corporate data model. The project, which has cost the UNDP approximately \$300,000 after 18 months of development, was designed to provide a logical framework for a corporate database so that all future systems can be designed for that database. In addition, the corporate data model would allow UNDP to retain its existing field systems.

The UNDP has decided to standardize data modeling, page 74

## ON SITE

### U.N. Development Programme New York

**Challenge:** To facilitate file transfers and reduce redundant data entry for 120 field offices.

**Technology:** Logic Works' Erwin, Microsoft's FoxPro, Sybase's 4.9 Unix RDBMS.

**Results:** Expected to enable global field offices to share common systems, allowing the UNDP to retain its investments in existing systems.

## HP plans to introduce large Unix servers this fall

### Users reluctant to pay big bucks for big iron

By Mark Halper  
PALO ALTO, CALIF.

Some recent modifications and price cuts by Hewlett-Packard Co. to its Unix line of minicomputers do more than underline the resistance HP has encountered from price-wary users balking at upgrading to the company's big iron.

HP's moves are also intended to clear room for a fall introduction of HP's largest-ever Unix systems, which will offer twice the number of processors and incorporate more powerful versions of HP's Precision Architecture-RISC chip.

HP introduced its Corporate Business Servers as the centerpiece of its mainframe-alternative strategy a little more than a year ago. In the last month, it slashed prices almost in half — from \$668,500 to \$360,000 for a four-processor version, for example — and began including software, such as databases, that previously cost extra.

Around the same time, HP rolled out more powerful versions of lower-priced Unix machines, giving power users a less expensive option to the pricey Corporate Business Servers [CW, June 28].

The company confirmed that it plans to bring out more powerful machines "later this year," and analysts and users said they expect those machines to be priced no higher than the old Corporate Business Servers.

The new machines will house up to eight processors, compared with a maximum of four on the current Corporate

Business Servers, which are also known by their old code name, Emerald. They are also expected to house the 7100 version of HP's PA-RISC microprocessor; today's models use less powerful editions of the chip.

Emerald got off to a rocky start last year when HP encountered manufacturing problems tied to one of its parts suppliers, which HP has never identified.

Once HP resolved the problem, it registered brisk shipments of Emerald systems. HP likes to boast that it delivered 200 by the end of last year. But the company is reticent when asked about shipments during the first half of this year, and all indications are that high-end business has slowed.

### Ready for more power

The cut in orders seems to be the work of a double-edged sword. One main reason, according to Salomon Brothers, Inc. analyst John Jones, is to set the stage for a fourth-quarter announcement of the more powerful systems.

"They're posturing for a rollout of a second round of Emerald products in the October/November/December time frame," Jones said. HP declined to com-

mit to a specific time frame.

Eric Fisher, principal at Fisher Systems Consulting in Groton, Mass., said he thinks HP will introduce the new systems before Oct. 31, which marks the end of the company's fiscal year.

"They'll be looking for an end-of-the-year kicker," he said.

The other factor apparently mitigating Corporate Business Server sales is user wariness over big ticket purchases. General economic conditions have not helped, analysts noted.

"Right now, not too many people are buying \$400,000 machines, let alone \$1 million machines," said S. G. Warburg & Co. analyst David Wu. "People have to have the money to spend."

"There's nothing wrong with the system. It's what's wrong with the world," observed Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco. "HP's strategy is targeted at IBM replacement. That market is sort of stuck because customers have been unclear what they want to do, and they don't always have the capital budget to do it."

Gordon Kerr, Hyatt Hotels Corp. senior vice president of MIS, further pointed out that when HP expanded the midrange of its Unix minicomputer line upward, it

gave users less reason to pay hundreds of thousands of dollars more for the Corporate Business Servers.

Fisher agreed, pointing out that because the new midrange models use the 7100 processor, they could actually outperform the Corporate Business Servers for integer-intensive operations, although the Corporate Business Servers would still be more suitable for I/O-intensive transaction processing involving hundreds of users.

But while users have apparently been balking at buying today's Corporate Business Servers, a beefed-up product at about the same price just might make a difference, Fisher observed.

"When the 7100 gets into the Emerald, hold on to your horses," he said.

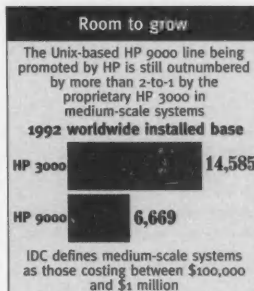
### Power sells

Mark Shirman, president of Innovative Information Systems, Inc., a Norwood, Mass., integrator, added to that assessment, noting companies that are considering migrating from proprietary mainframes to Unix boxes may be more likely to make the switch if they trust the power of the replacement box.

"The more power that's there, the better it is for them," Shirman said.

His firm has been involved in many HP mainframe downsizing projects with customers including Paccar, Inc., Weyerhaeuser Co., Minnesota Mining & Manufacturing and Levi Strauss & Co.

Software conversion efforts are also less tedious when they are from a mainframe to a large Unix box than to several smaller Unix machines, Shirman said.



# Re-engineering pays off at Cigna

By Thomas Hoffman  
PHILADELPHIA

After completing about one-third of a four-year project to re-engineer one of its customer service units, Cigna Corp. is beginning to see impressive results, including a 35% rise in staff productivity through process changes, and it expects more gains through the use of new technology.

Seeking to provide faster and better response to customers' inquiries, Cigna combined what had been stand-alone customer service, billing, claims and other functions into a cohesive set of teams at its Voluntary Insurance Products Division.

An infusion of new technology will complement the team concept. Cigna replaced its rigid IBM 3270-type terminals with an OS/2-based Token Ring local-area network running IBM's LAN Server network operating system. By year's end, the OS/2 system will include Windows-based visualization software designed to enable customer service representatives to toggle between a slew of departmental systems.

## Faster service

Empowered with information from billing, claims and other departments, the unit's customer service representatives were able to process 35% more inquiries in the year following the re-engineering than they did prior to the initiative, ac-

cording to Benjamin A. Tomb Jr., senior vice president of Cigna's customer services.

Furthermore, Tomb said the unit, which handles 30,000 inquiries per month, stands to triple its productivity once the Windows-based system and a new work-flow strategy are implemented.

Eventually, he said, the company expects to reduce the costs of servicing its insurance products by 65%. Though he declined to disclose what the actual payback would be, Tomb said he expects the information technology implementation to contribute to three quarters of the cost savings.

Tomb would not speculate on when Cigna is expecting a return on its technology investment.

Such productivity gains, while startling, are not unusual. Most insurance firms are in the midst of re-engineering their customer service departments and one, United Services Automobile Association (USAA), has made significant strides, according to Catherine M. Weston, a partner in the insurance consultant practice at Ernst & Young in Boston.

Weston said USAA set a benchmark for the insurance industry when it re-engi-

neered its customer service operations and pioneered the use of image technology at its San Antonio headquarters in the late 1980s.

"Insurers are taking cues from companies that do customer service well, including airlines and mail-order catalog companies like L. L. Bean, where a question gets answered on a first call," Weston said.

Voluntary insurance products, which include group universal life insurance and long-term care insurance, have been a hot ticket for Cigna. The company has seen annual revenue growth of 20% to 30% during the past four

years, and these rates are expected to continue, analysts said. To meet that growth while improving customer satisfaction and curbing the unit's escalating costs, an overhaul of the division's operations was necessary, according to Tomb.

For example, in the past, when customers would call in with a billing problem, a Cigna customer service representative would have to request and receive information from the billing department before returning the client's call.

Cigna changed that by cutting out lay-

ers of bureaucracy. Now, the customer representatives are "generalists" who have been trained to handle new functions, including billing and claims.

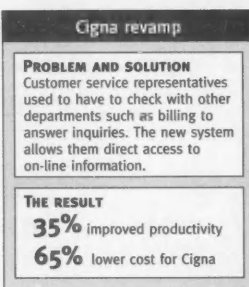
"Re-engineering has given me the opportunity to learn a lot more about the product itself and expand the knowledge of everyone else who works here," said Valerie Pasalodos, one of Cigna's customer service representatives.

## Satisfied customers

Before the re-engineering project began, Cigna's "first-call satisfaction" levels hovered at around 75%, Tomb estimated. But since streamlining these functions so that teams of customer representatives could answer nearly all inquiries on a first-call basis, call satisfaction has improved to greater than 90%, Tomb said.

That compares favorably to industry rates, which analysts put at 30% to 80%. To date, Cigna has been able to achieve these results solely through the transformation of the unit — before any technological changes have been put in place.

Cigna's productivity gains and cost savings are expected to rise even more once new technologies are added to the team concept. At the heart of the system, Tomb said, is a Windows-based visualization software package from Easel Corp. resold by IBM. The package allows customer service representatives to toggle between systems in other departments to gather account information more effectively.



# Tandem leans on RISC for growth

By Jean S. Bozman  
CUPERTINO, CALIF.

Tandem Computers, Inc. is betting on reduced instruction set computing (RISC) and open systems as avenues of growth for the \$2 billion company, introducing a revamped RISC-based fault-tolerant computer line that analysts said could compete directly with general-purpose Unix servers from Hewlett-Packard Co., Sequent Computer Systems, Inc. and Pyramid Technology Corp.

That means the new NonStop Himalaya computers will carry much lower price tags than non-RISC Cyclone machines.

Tandem has traditionally charged a premium price for its fault-tolerant systems. Now it is trying to overcome a recent sales slowdown by focusing on overall price/performance. It optimized its NonStop operating system for MIPS Technologies, Inc. RISC chips, boosting performance of the low-end and midrange NonStop machines by up to 30% and overall price/performance by up to 60%. The new high-end NonStop Himalaya K10,000 machine, a massively parallel processor, has

twice the power of the current Cyclone machine, Tandem said.

Longtime Tandem users said they are happy about increased price/performance and lower price tags, but many said they have not yet considered putting Posix on their Tandem systems. "Cost is going to be a big deal for us," said one Midwest user who did not wish to be named.

He said he is concerned that Unix processors at his site will not be as reliable as the older Tandem machines. "Once we have more experience with Unix systems, we will have evidence about whether Tandem's fault tolerance is easier to justify."

## Hardware purchases

Consolidated Freightways, Inc. has just installed four Cyclone/R machines to replace eight older Tandem V1X machines in its Portland, Ore., data center, said Phil Seeley, vice president of administration and technology. It also purchased 48 CLX and CLX/R mid-range processors that run Consolidated Freightways' image processing system for scanned documents. "We bought the CLXs that were coming off a three-year lease," he said. "The price

was attractive, it's good technology, and they're reliable." Seeley said he has no plans to use Posix.

The new Posix option, which will allow users to write Unix-compatible applications that run on top of Tandem's proprietary Guardian fault-tolerant operating system, is intended to attract new sites. It is not a full Unix implementation, unlike Tandem's Integrity line of Unix System V Release 4 servers. That contrasts with competitor Stratus Computer, Inc.'s offering of separate VOS fault-tolerant and Unix System V.4 fault-tolerant versions of the same machine, both scalable.

However, analysts said the new Posix interface could broaden Tandem's appeal beyond the banking and telephone industries where its fault-tolerant system is already popular.

Client/server applications could also boost Tandem sales at new sites, analysts said. Tandem's new partnership with Unix System Laboratories, Inc. (USL) will allow many types of PC and Unix workstation clients to attach to Tandem servers via USL's Tuxedo transaction monitor, USL President Roel Piepers said.

The NonStop Tuxedo software will go into beta testing early next year and is slated to ship in late 1994, USL said.

## Kernel of power

The power boost for Tandem's K100 and K1000 processors — enhanced versions of the current CLX/R and Cyclone/R machines — resulted mostly from changes to the NonStop Kernel fault-tolerant operating system, Tandem said.

The K100 and K1000 are 3.6 times as powerful as their non-RISC equivalents, said Chris Rooke, manager of Tandem on-line transaction processor systems marketing. The K100 and K1000 are due to ship in September. Entry-level prices will range from \$25,000 for a K100 to \$339,000 for a K10,000 model.

Tandem claimed that its K10,000 high-end machine, due to ship in December, would support more than 10,000 transactions per second if thousands of RISC chips are used. But most users will not install anything near the limit of 4,000 150-MHz R4400 processors due to space and price considerations.

Two processors will fit in a single cabinet, providing 100 transactions per second. A new fiber-optic link called Torus-Net links up to 16 RISC processors to handle related tasks, Rooke said.

— Jean S. Bozman

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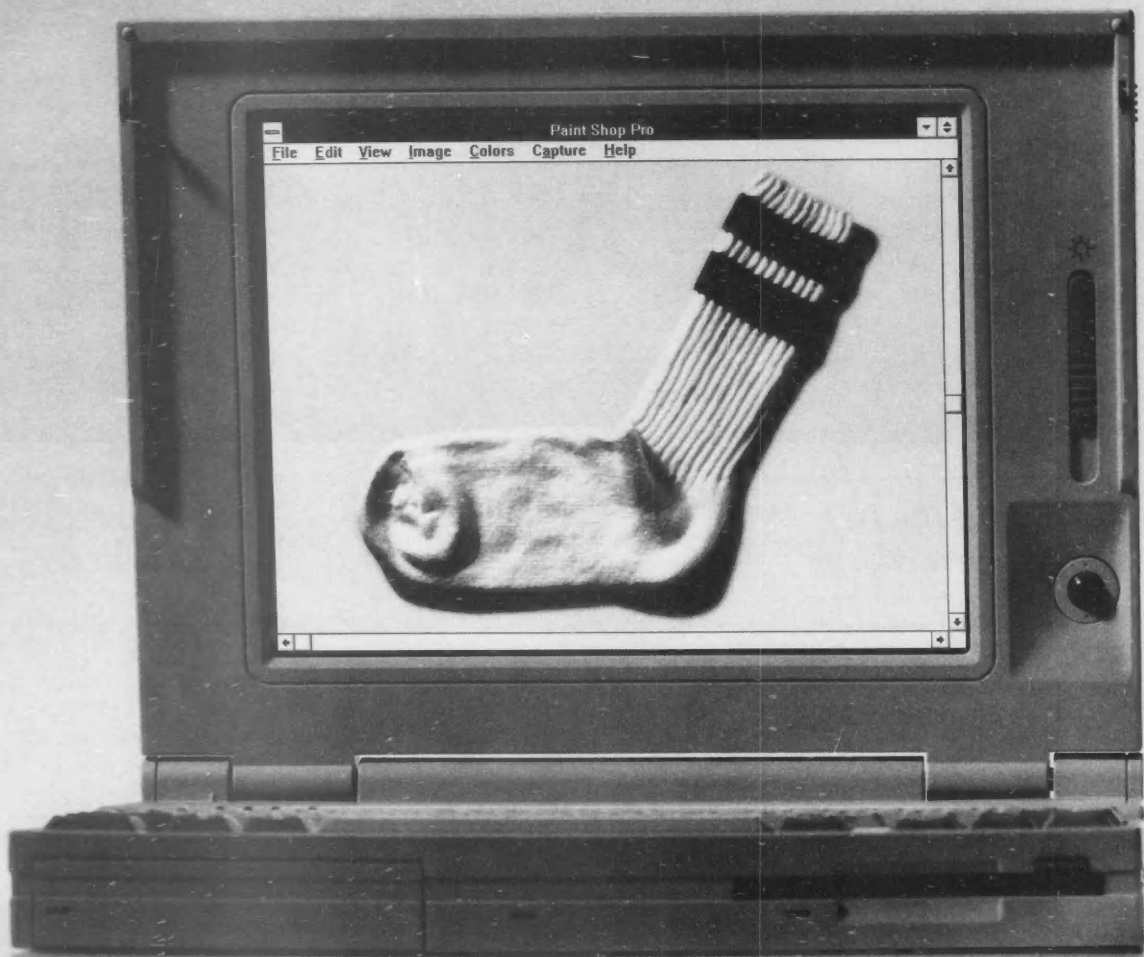
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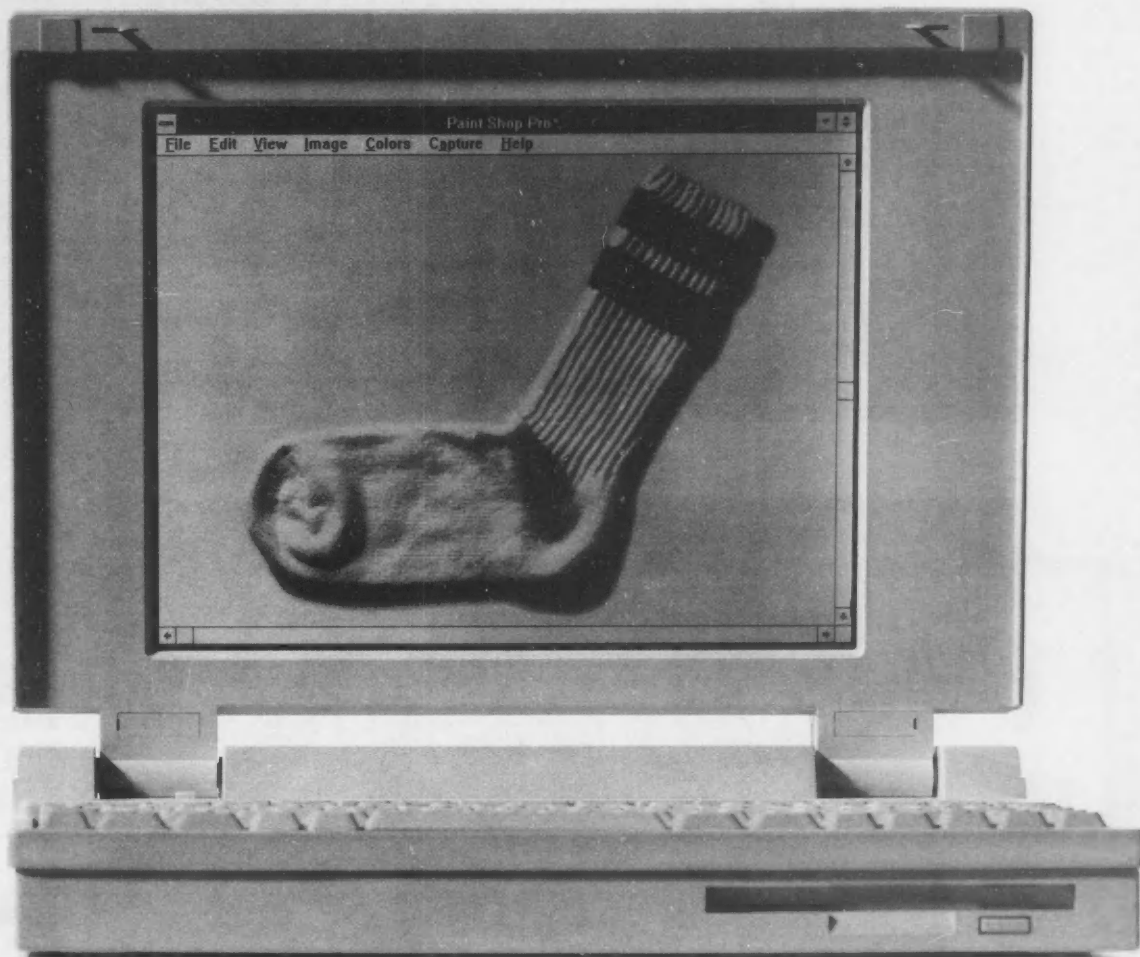


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## Data modeling

CONTINUED FROM PAGE 69

its headquarters systems on SQL under Unix and Xbase in its field offices. Once the data model has been completed by the end of this year, a field office in Bolivia should be able to share an administrative system with an office in Ghana.

It will probably take years before all of the field systems are brought onto the data model, according to Chisholm. Still, the UNDP has made strides. For example, the agency plans to bring a full set of systems from its Latin American field offices onto the data model by the end of this year.

"What we're trying to do is develop one physical architecture worldwide for all field offices to build into," said Chisholm, who was unsure of UNDP's investment in existing systems.

Central to the UNDP data modeling project is Erwin, a database design suite from Logic Works, Inc. Staff members at UNDP's field offices are using Erwin to reverse-engineer data to run in Microsoft Corp.'s FoxPro application development environment. Meanwhile, systems specialists at UNDP's headquarters here are using Erwin to move data from a Computer Associates International, Inc. CA-IDMS relational database management

system to a Sybase, Inc. 4.9 Unix RDBMS.

The data model has been designed so that file transfer between Unix or Xbase environments is seamless, Chisholm said.

UNDP, with a \$10 million information systems budget for this year, considered standardizing all its field systems on Unix and SQL to achieve complete integration, but that plan would have been far too expensive and difficult to pull off at this time, according to David E. Joel, director of UNDP's Division of Management Information Services (DMIS). Joel said the agency will eventually make the transition to Unix, but it has not yet determined those costs.

### Best for users

If carried out properly, data modeling projects can be quite effective for end users, according to Ronald G. Ross, editor/publisher of "Database Newsletter," which is published by Database Research Group, Inc. in Boston. "A data model is the best way we know today to make that translation of what users want from the business and a physical implementation of that," Ross said.

Selling the data modeling concept to UNDP's management was slightly more challenging, Joel said. "The idea of data analysis and data modeling was somewhat foreign to this organization," he added. "The concept that you would have

data-organized structure between systems hasn't seemed to reach most business people."

But after explaining how data modeling could help UNDP better integrate its systems and cut down on redundant data entry, Joel and his staff were able to persuade the management committee to fund the project in February 1992.

DMIS began its implementation a month later in Costa Rica. At that time, the UNDP hired a consultant to train its Latin American field staff to identify and choose the best in each class of database applications they were running. Then, using Erwin, the staff members learned how to reverse-engineer their applications so the data could be incorporated into the model.

These efforts should be buttressed by planned communications enhancements. Currently, 75% of the field offices are connected to UNDP's headquarters using BT Tymnet's Dialcomm electronic-mail service through dial-up connections, according to Hossam Galal, who is responsible for systems delivery at DMIS. However, the dial-in connections will be phased out as UNDP increases the number of field office local-area networks and connects them to its headquarters.

Currently, 30 field offices have ArcNet or Ethernet LANs running Novell, Inc.'s NetWare operating system.

## Wang program to offer imaging certification

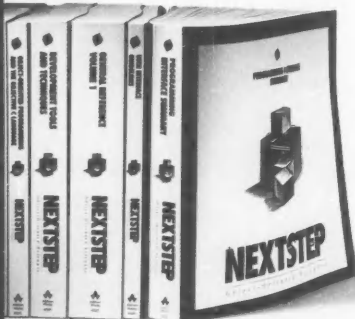
By Craig Stedman  
LOWELL, MASS.

Trying to boost demand for the imaging technology on which much of its future rides, Wang Laboratories, Inc. has set up a program to train resellers, consultants and systems integrators to design and install image systems.

Imaging sales have grown much more slowly than expected, and Wang blames that in part on a lack of imaging expertise in the market, said David Goulden, vice president of marketing.

He said Wang hopes to train 1,000 people during the next 18 months through the Wang Certified Image Consultant Program, which starts this month. About \$2 million will be invested the first year, and the \$4,700-per-person program is expected to break even during that period.

Goulden compared the program to Novell, Inc.'s certification training for NetWare engineers. While there is no requirement that participants agree to resell or work with Wang products, he said increasing Wang's market visibility "obviously is part of the objective."



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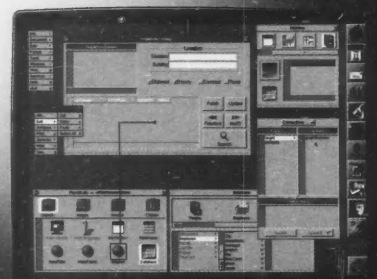


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## Large Systems

**Softworks** has announced CAT Scan 2.5, a flexible tool designed for reporting on Integrated Catalog Facility and VSAM catalogs.

Features for CAT Scan include a control card generator for VSAM Manager; a control card generator for DF/DSS Dump processing; generic selection of System Managed Storage data classes, storage classes and management classes; candidate volumes; selection; and display of fields such as last update date and time.

The ability to search through every catalog connected to the master catalog is also provided.

CAT Scan is compatible with IBM's MVS, MVS/ESA and MVS/XA operating systems. License fees begin at \$4,450.

► **Softworks**  
7700 Old Branch Ave.  
Clinton, Md. 20735  
(301) 856-1892

**BGS Systems, Inc.** has released Version 4.0 of the Best/1 for Open VMS capacity and performance management system for Digital Equipment Corp.'s Alpha AXP architecture.

The product offers daily performance reporting and performance prediction for VAX and Alpha AXP systems.

Features such as the ability to predict

and report the system load on controllers, channels, interconnects and devices are provided. Best/1 for Open VMS can monitor performance and make choices about planning upgrades and determining optimum configurations.

Prices start at \$20,000.

► **BGS Systems**  
128 Technology Center  
Waltham, Mass. 02254  
(617) 891-0000

**Software Engineering of America** has announced FastGENR 2.5 for MVS XA/ESA environments.

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Prices range from \$9,900 to \$36,450.

► **Software Engineering of America**  
1230 Hempstead Tpke.  
Franklin Square, N.Y. 11010  
(516) 328-7000

**Baber Information Services, Inc.** has announced Reveal Job Scheduler for the IBM Application System/400.

Features for the product include multiple user-defined calendars, as many as 10,000 requests/executions per job event, conditional branching within job requests/executions and user-defined

Date Parameters that can work as parameters or keyword values within job requests/executions.

The product provides future planning pictorial display/reports for work-load balancing, audit trail and tracking and reporting. Job completion messages can be tailored and sent to multiple users.

Every application can have its own user-defined calendar. Reveal Job Scheduler offers unlimited report regeneration and distribution capabilities, even across networks, the company said.

Reveal Job Scheduler has tiered prices ranging from \$600 to \$6,000.

► **Baber Information Services**  
4417 N. O'Connor Road  
Irving, Texas 75062  
(214) 650-0506

**Xerox Printing Systems Division** has introduced the Xerox Document Print Executive/400 (XDPE/400).

The print management software was designed to provide IBM Application System/400 computer users with automatic access to the full features of Xerox-intelligent, cut sheet laser printing.

With the product, unformatted data can be changed into professional-looking documents, the company said. Electronic forms, signatures, logos and fonts can be mixed with variable computer data to generate custom documents for applications, including accounts pay-

able, general ledger, OfficeVision/400 and more.

Without any operator intervention at the printer, AS/400 users also receive access to Xerox-intelligent laser printer functions, which include capabilities such as two-sided printing.

A single copy of the XDPE/400 software for use with Xerox laser printers operating at 50 page/min. and lower output speeds costs \$1,995. The XDPE/400 costs \$4,995 for Xerox laser printers above 50 page/min. output speeds.

► **Xerox Printing Systems Division**  
800 Long Ridge Road  
Stamford, Conn. 06904  
(203) 968-3000

### Hardware

**Computer Power, Inc.** has released the Trimax II smart series Uninterruptible Power System.

The Trimax II three-phase, double-conversion, on-line system offers continuous power protection for mainframes and minicomputers, process controllers and telecommunications systems.

The product is available in 14 different power ratings, handling 10- to 420-kVA loads. Prices begin at \$23,986.

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**IBM**

# IBM pins AS/400 hopes on object-oriented

By Craig Stedman  
ROCHESTER, MINN.

IBM has started shipping the first piece of a planned object-oriented application development environment that it expects will become the key development platform for Application System/400 computers by 1996. However, not everyone is convinced AS/400 users will be so receptive.

First out of the object-oriented gate from IBM at the end of last month was Envoy/400, a client-level tool set based on the Smalltalk/V language and Ottawa-based Object Technology International, Inc.'s Envoy/Developer cooperative development software.

Following a two-pronged strategy, IBM said it plans late this year to add an initial C++ language implementation, again to write client applications that could access AS/400 files and programs. Full server versions of both products have been promised within two years.

John Swainson, manager of application development technology at IBM's Toronto software laboratory, said recently the company expects the object-oriented products to replace its RPG language as the dominant development medium for the AS/400

"by the mid-'90s at the latest."

However, analysts said they were skeptical about how quickly object-oriented technology will be embraced by AS/400 users, especially the proverbial mom-and-pop shops that make up much of the customer base.

Envoy/400 has "a fairly significant learning curve," even for advanced users, said David Andrews, managing partner at ADM Consulting, Inc. in Cheshire, Conn.

"They will be selling snow cones in Hades before the installed base gives up on RPG," said Teresa Elms, president of Elms Information Services Group in San Diego. With IBM trying to remake the AS/400 into an open client/server platform, the object-oriented strategy appears to be aimed mainly at making it more attractive to new users, she said.

Jeff Broberg, vice president of research at Software 2000, Inc., a Hyannis, Mass., application vendor that beta-tested Envoy/400, said it "has helped us immensely" in reducing development times. But he, too, said the object-oriented approach is not for everybody.

Envoy/400 "takes a large commitment from an organization to produce the results you want to have," Broberg said. "This is really heavy-duty stuff here." Software 2000 set up a 30-person development group to work with the product, he noted.

Some large AS/400 shops said they are champing at the bit. "I'm pleased IBM is

moving to objects because I think it's ready for the commercial market," said Scott Plumer, project manager for Gannett Co.'s data center in Silver Spring, Md.

Roger Finoli, manager of planning and technology at Dominion Textile, Inc. in Montreal, said he is interested in adopting an object-oriented approach. Its learning curve of three to six months is no longer than that of fourth-generation

languages, he said.

However, Marc Cohn, senior vice president of information services at Enterprise Rent A Car Co. in St. Louis, said IBM's plan to add support for its Integrated Language Environment to RPG lessens his need to move away from that language. "To support the main flow of business, you don't need to construct a new model," Cohn said.

## Lending library

Included in IBM's plans are object libraries that customers could use in building applications. Libraries supporting multiple vertical industries are due out in late 1994 or early 1995, and industry-specific libraries should follow one year later, IBM said.

## Price hurdles

An immediate block for Envoy/400 is its price: \$15,000 per user with a minimum three-seat requirement. "I couldn't even get near it" at that price, Plumer said. And Broberg described the cost as "nasty."

Jim Harens, director of development technologies at IBM's Application Business Systems unit, said the pricing and three-seat minimum were set "to make sure customers were serious" about using Envoy/400. However, Harens acknowledged the expense, and he said a pricing change is in the works.

Envoy/400 includes a tool for building graphical user interfaces and has built-in support for accessing AS/400 files and programs, IBM said. The Smalltalk/V product is intended for high-level application development, while the future C++ offering is expected to be used more for writing lower-level system software, according to both IBM and analysts.

## Objective: Objects

IBM's schedule for adding object-oriented application development capabilities to the AS/400 computer line

PRODUCT	FEATURES	AVAILABILITY
Envoy/400	• Based on Smalltalk/V language • Graphical user interface support • Supports OS/2, Windows 3.1 clients • Access to AS/400 files and database	July 1993; server version to follow in 18 to 24 months
C++	• Aimed at future PowerPC models • Visual programming tools planned • OS/2, Windows 3.1 support planned	Client version in late 1993; beta-test server in 1994; full release in 1995
SOM/400	• Implements IBM's Corba-compliant System Object Model spec • Distributed applications support planned eventually	Beta-test tool kit in 1994; full release in 1995

## Development tools

# TI retools for client/server

By Johanna Ambrosio

Texas Instruments, Inc. has revamped its mainframe-based development tools to work in the client/server world.

The Information Engineering Facility (IEF) for Client/Server will be delivered next month. New platforms include Microsoft Corp.'s Windows 3.1, OS/2, Hewlett-Packard Co.'s HP/UX operating system and Digital Equipment Corp.'s VMS operating system, among others. Additional platforms — including Microsoft's Windows NT and platforms from Sun Microsystems, Inc., Tandem Computers, Inc. and others — will be ready in the next year or two.

"We're losing our mainframe baggage," said Johnny Long, TI's director of IEF products and services. TI's existing customer base of 750 sites are exclusively mainframe-oriented.

TI, page 80

# RPC tool kit takes hold at First Boston

By Jean S. Bozman  
NEW YORK

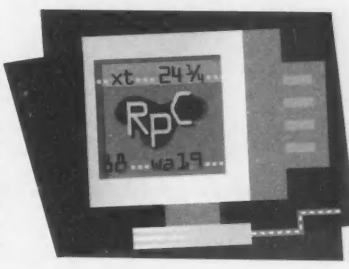
First Boston Corp. started on the path to distributed computing years ago when it installed scores of Sun Microsystems, Inc. and other Unix workstations to support its trading activities.

But it took another step last fall when it began to use a remote procedure call (RPC) tool kit to distribute Unix client/server applications across the network.

The new tool, EZ-RPC from NobleNet, Inc., a small Southboro, Mass., start-up, has allowed developers to generate client and server "stubs" for distributed Unix applications. That way a trading application can incorporate real-time data feeds from stock market quotation services.

## Linking old with new

The technology is a way to marry existing data-broadcast technology with emerging distributed computing networks. "We've got all these traders' workstations, and when a new



David H. Schwartz

price comes along, we want all these stations to receive it at the same time," said First Boston Chief Technology Officer Chip Steinmetz. First Boston uses Quotron Systems, Inc. technology to broadcast the real-time data feeds.

The RPC tool kit generates software that is in the fifth layer of the seven-tiered Open Systems Interconnect networking protocol stack, making it accessible to user applications.

"Now, instead of working at the transport layer, we're working at the session layer, so we have an easy interface for our programs," Steinmetz said. Applications can "grab" the updated trading data as it is broadcast over the Transmission Control Protocol/Internet Protocol network.

The pricing data originates in IBM mainframes running DB2, then crosses an IBM LU6.2 Systems Network Architecture gateway to reach the network of Unix machines.

The first release of EZ-RPC-based applications at First

Tool, page 81

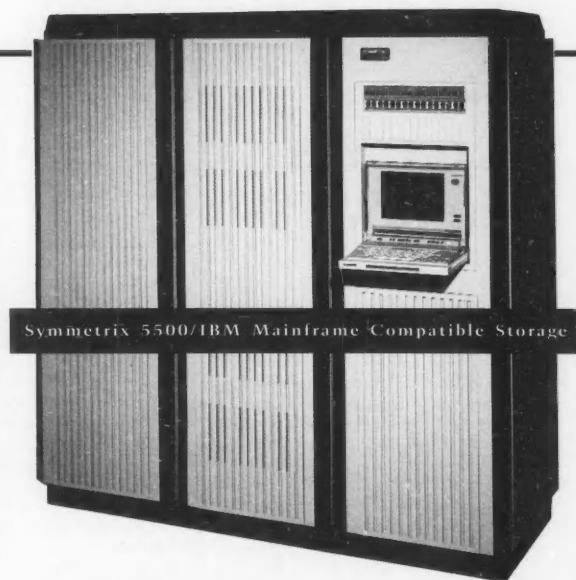
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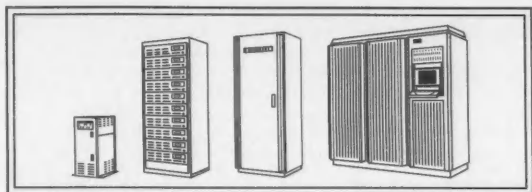
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THE STORAGE ARCHITECTS

## TI retools for client/server

CONTINUED FROM PAGE 77

Key to the reworked tools is an encyclopedia that tracks all of the applications under development by teams of people in different departments or wherever they might be. New versions of the encyclopedia, based on the same one that now runs on IBM mainframes, will run on HP/UX and VMS as well as a local-area network under OS/2.

### Software options

Another major difference in the new version is that it provides more options for users to develop software, TI managers said. With many development tools, users have to lump all the portions of the code into one effort: the interface, the core application logic and the data services.

With the new IEF, however, users can separate those components to develop them — and deploy them — on different platforms. In addition, TI sells a business modeling tool as part of the suite.

While some observers questioned whether TI's integrated set of development tools will make it in the plug-and-play world of client/server computing, customers seemed satisfied.

Michael Quintero, senior technical an-

alyst at Blue Cross/Blue Shield in Jacksonville, Fla., was a user of the mainframe-based IEF. He said he has been using the new IEF version to develop a correspondent's system that will enable Blue Cross employees to send letters and other documents to clients about benefits changes and claims information.

The application, which was in development about a month, runs in Microsoft's Word for Windows under OS/2. Whenever an employee needs an address or piece of information from the DB2 database sitting on the mainframe, he pulls down a Word menu. The request is sent and the information returned to the application.

"We can allow the user to stay in the environment he is used to and hit databases he doesn't even know exist," Quintero said.

Likewise, the development platform has been OS/2, although the company might develop for Windows NT.

Quintero said he likes using IEF because developers are already familiar with it. "It's stable, and we won't have to

throw away the application in a few months."

The IEF-developed application at Union Pacific Technologies in St. Louis was a bit smaller in scale. For one thing, it was developed as "proof of concept" only and is not intended for production, said busi-

ness systems consultant Don Black.

Second, the work involved replacing just the graphical interface portion of an application used in the information systems department — going from something written under the OS/2 Database Manager to using Windows and Oracle Corp.'s Oracle database.

Despite the relatively limited scale, Black said, "it was very time-consuming and very difficult. The next time should be easier." Still, he said, IEF for Client/Server "will be our development platform of choice going forward."

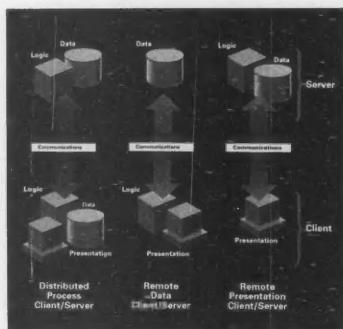
### Uncertain future

Meanwhile, analysts were split on whether TI's integrated tool kit will prosper in the client/server environment, where many customers so far have opted for individual tools for specific needs rather than going with a one-stop shopping approach.

"The market has changed since the old mainframe days," said Ed Acly, an analyst at International Data Corp. in Framingham, Mass. "There are benefits to the integrated approach because the distributed world is more complex, but how successful TI is going to be remains to be seen."

Acly added that TI will likely make the biggest hit with mainframe customers who want to slowly evolve into client/server environments.

But Norton Greenfield, an analyst at Computer Intelligence/Infocorp in Westboro, Mass., said, "TI is moving traditional CASE into the '90s. They have thought through the issues of what it takes for companies to move big systems to client/server."



The Information Engineering Facility for Client/Server supports many styles of client/server computing

**CRAIG BROWN'S**

**OVERHEAD PRESENTATION**

**WAS SO IMPRESSIVE**

**NO ONE NOTICED THE**

**GUACAMOLE ON HIS TIE.**

## RPC takes hold at First Boston

CONTINUED FROM PAGE 77

Boston is in limited production, with just 10 traders using the distributed Unix software since late May. If the New York trial run of the distributed applications goes well, it will be expanded to other U.S. regional offices this month, Steinmetz said.

First Boston has about 700 Sun workstations and several Unix servers on

its network.

The same technology will also be used to allow trading applications to interface with real-time data feeds from many information vendors, Steinmetz explained. "We've begun to create a generic broadcast protocol," he said. "We'll give it to the application programmers so they think they're calling a simple API."

## Divide and conquer

**N**obleNet's EZ-RPC's compiler can divide application functions contained in a C language program. "It allows a C programmer to take any subroutine or API and break it apart from the application so that it can run on another machine," explained Dennis Ford, chief executive officer at NobleNet.

Unix System Laboratories, Inc. is incorporating EZ-RPC as its answer to a number of Open Software Foundation Distributed Computing Environment RPCs, industry analysts

said. The RPC tool kit generates client and server "stubs" that allow users to distribute application functionality, said John Rymer, an analyst at the Patricia Seybold Office Computing Group in Boston.

"This technology makes RPCs a transport mechanism rather than a primary interface," Rymer explained. "You're defining little pieces of code that you link into your application." The net result is that application programmers can use the tool kit to generate RPCs automatically.

**Mercury Interactive Corp. and Imperial Software Technology** have announced product integration between Mercury's XRunner automated software testing system and Imperial's X-Designer graphical interface builder.

According to the firms, XRunner 2.0 uses a new object-oriented record and replay technology that generates test scripts that can be used for future releases and ports. The process of user interface design is automated by X-Designer, producing code that is portable across multiple platforms.

X-Designer coupled with XRunner's support for object-oriented testing permits X-Designer to generate applications that have built-in testability supported by XRunner, the companies said.

A single-user license of X-Designer costs \$3,500.

► **Mercury Interactive**  
3333 Octavius Drive  
Santa Clara, Calif. 95054  
(408) 987-0100

**Watcom International Corp.** has announced VX Rexx visual solution builder that enables users to develop graphical user interface (GUI) applications for OS/2.

VX Rexx includes a visual GUI form de-

signer, a project management facility and an interactive source-level code debugger.

VX Rexx uses IBM's OS/2 Rexx, which is included with the OS/2 operating system, and it can be used as a scripting language for "Rexx aware" applications. The product also exploits multithreading and uses OS/2's 32-bit capability at design time and execution time.

Until Sept. 30, VX Rexx is available for \$99. After that date, the product will cost \$299.

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# HOLD on to your HEAD



Despite a high number of CIO dismissals, IS superstars such as Progressive Corp.'s Allan Ditchfield are in heavy demand

*Record-high CIO turnover is keeping execs — and companies — hopping. Here's why things aren't likely to get better and tips for surviving.* **BY JULIA KING**

**C**hief information officers hired within the past year can expect to stay in their current job between 18 and 24 months — slightly longer than the shelf life of a box of Shredded Wheat.

Unfortunately, despite some encouraging signs in the national economy, turnover among technology bosses is not expected to improve — and may worsen — during the remainder of 1993, according to consultants, executive recruiters specializing in information systems placement and CIOs.

Observers report a rise in job-changing activity that many believe will affect both individual careers and entire IS organizations

and corporations.

"Turnover is accelerating. I can tell by the number of headhunters who call me," says Allan Ditchfield, CIO at The Progressive Corp., a \$15 million insurance company in Mayfield Heights, Ohio. "They're not necessarily calling to buy me but to network."

In the last few weeks, Unum Corp. CIO John Alexander and Sprint Corp. CIO Ron Ponder topped the list of job-changing senior IS executives lured to more lucrative posts. (Alexander went to private consulting, Ponder to former rival AT&T.) Such superstars are lured by the promise of mega-compensation, which in Ponder's case topped \$2 million a year.

Statistics support Ditchfield's experience. A recent Deloitte & Touche survey found that CIO turnover hit a record high in 1992, especially at large firms [CW, July 19]. At companies with revenue of \$5 billion or more, the figure reached 25%. That's nearly a 100% increase from the average CIO turnover the previous year.

Overall, the consulting firm said that one-third of CIOs in 1992 took over from predecessors who had been dismissed or demoted.

That's quite a change from a couple of years ago. Back then, a CIO could safely assume that his job was safe, even a place to flourish professionally for three or four years. But corporate reorganiza-

tion and downsizings, mergers and acquisitions, work-flow redesign and outsourcing continue to erode CIO tenures and security.

Other factors are also to blame, says Gary Kaplan, an executive recruiter in Pasadena, Calif. Several stem from the CIO's higher visibility and top management's higher expectations about what computers and networks can do.

In many firms, technology-smart senior executives voice a growing frustration over low payoffs from technology investments and initiatives. A *Computerworld*/Andersen Consulting study earlier this year found that more than half of 200 chief executive

**CIO turnover, page 86**

## CIO turnover

CONTINUED FROM PAGE 85

officers, chief operating officers and chief financial officers surveyed were not satisfied with payoffs from their company's IS spending. Naturally, Kaplan says, they blame the IS chief.

Things further worsen when top managers begin to believe — fairly or not — that IS did not provide adequate information for key decisions. Their solution: Fire the CIO.

"When top management doesn't get what it wants from IS, the trend is to change top IS leadership to get its needs met," Kaplan says. "It's not so much that the incumbent CIO is incompetent — rather, that he or she is unable to take a company to its next stage of development."

More often than not, IS change involves hiring from outside the traditional IS ranks.

Technology itself is also a culprit, says Ted Standish, a former Gillette Co. executive who last July voluntarily left to join CSC Index, Inc., a Cambridge, Mass., consulting firm.

"Because technology changes so swiftly, the CIO must make more and more technology choices to move the company forward. Inevitably, a week later perhaps, some choices will be shown to be not as good as they could have been," Standish says.

It's a deadly dilemma. CIOs who are brave enough to keep up with technology risk having their decisions backfire, he notes. On the other hand, CIOs who wait until technology matures can find themselves in analysis paralysis.

Another big problem, adds Raymond Manganello, president of Gateway Management Consulting in New York, is a potential clash between CEOs and CIOs.

The two, he notes, often have vastly differing mind-sets on important issues ranging from change, restructuring, IS cost-cutting (which CIOs generally consider far more important than their bosses) and business process re-engineering.

### Staffs suffer, too

If accelerating turnover is alarming to CIOs, it's also unsettling to entire IS staffs. Whoever takes the IS reins, turnover at the top affects the entire IS organization.

"Change at the top is absolutely destabilizing," says Ditchfield, who left his post as senior vice president of systems engineering at MCI Communications Corp. to join Progressive in 1991. "When you come in from outside the company, there's at least one person who thinks he should have gotten the job and two others who are mad because that guy didn't get it. There's a real resistance."

He adds, "Like a comedian who's up on stage and being challenged to make the audience laugh, you're faced with a staff that's challenging you to show them how brilliant you are."

That's if you have a staff.

Larry Gunther didn't when he took over as CIO at Gillette North Atlantic Group in Boston. When Gunther hired on, Gillette was and remains in the midst of decentralizing its corporate IS staff and distributing personnel out to its divisions, he explains.

"Because I didn't inherit an organization, distrust on the part of staffers wasn't an issue. But there are other issues," he says. Chief among them: pent-up demand for IS services from functional managers and others who have little or no time to participate in key IS initiatives, including new systems for sales forecasting, distribution, requirements planning and customer service.

## HOT JOBS, cold bodies

Turnover rises sharply... especially at big firms.

### CIO TURNOVER

1991	14%
1992	17.5%

The percentage of new CIOs rose 25% — a significant increase.

### CIO TURNOVER RATES BY COMPANY REVENUE (ESTIMATED)

LESS THAN \$100 MILLION	7.5%
\$100 MILLION - \$300 MILLION	13%
\$300 MILLION - \$600 MILLION	20%
\$600 MILLION - \$1 BILLION	15%
\$1 BILLION - \$2 BILLION	20%
\$2 BILLION - \$5 BILLION	19%
MORE THAN \$5 BILLION	25%

CIOs in large organizations were three times more likely to change jobs than counterparts in small firms.

Firings and promotions dip... as established CIOs dig in.

### REASON CIOs' PREDECESSORS LEFT

	1991	1992
DISMISSED/DEMOTED	36.4%	33.1%
LEFT VOLUNTARILY	19.9%	20.1%
LATERAL MOVE	8.2%	9.0%
PROMOTED	12.3%	8.8%
RETIRED	9.0%	8.6%

Despite a modest drop in firings, one-third of all CIOs left involuntarily. Some experts say that figure will worsen in 1993. Successors tended to be hired from outside the company when a CIO was dismissed or fired.

### RESPONDENT EXPERIENCE

	YEARS IN CURRENT POSITION	YEARS AT CURRENT COMPANY
1992	5.0	11.2
1991	5.1	11.6
1990	4.8	11.6
1989	4.6	10.7
1988	4.5	10.9

CIOs with longer tenure tended to fare better than newly hired CIOs, whose tenure averages 18 to 24 months. This supports an earlier Harvard Business School study showing 300% higher turnover for newer CIOs.

Source: Survey of 534 North American CIOs by Deloitte & Touche

"A lot of plans were put on hold pending the hiring of a CIO," Gunther explains. "Now there's a great demand to move forward with urgency, but there is a problem with getting adequate user involvement. We want the best resources available to staff projects, but the problem is that those people are busy running

the business."

Standish is well-acquainted with Gunther's problem at Gillette. "When I left, there was a sizable effort going on trying to decide what the IS support strategy should be," he says. Three-hundred people were involved in IS, he says, with 100 of these at corporate IS, which essentially had its own agenda.

"It was like trying to command a convoy in the fog," Standish recalls, "and change direction with no communication between the ships."

In general, Standish says, the role of the CIO is becoming much more political than ever because today's IS departments are trying to serve so many different constituencies — senior executives, user groups and so on.

For the IS chief, politicking involves keeping track of who has the most power (which is constantly shifting) and who should be served first. The political ramifications alone were enough to persuade Standish to leave.

"The new CIO is faced with trying to serve so many different constituencies that someone will invariably be unhappy," he says. "The question becomes: 'What is the strength of the person who is dissatisfied with IS?' If you're smart, you try to satisfy the major power bases and sacrifice the rest. But if the power

CIO turnover, page 90

## SURVIVAL TACTICS

**F**ind out why your predecessor left. What expectations didn't he meet, and why wasn't someone from within the company elevated to the CIO position? Answering these questions will help you align IS priorities with business objectives and uncover the strengths and weaknesses of the IS organization.

• **Be up front.** Tell people their jobs may change, even if you're not sure exactly how. Candor will help to dispel staff anxiety.

• **If hiring new staff, don't be afraid to hire people as good as you are.** This indicates that you have a succession plan in place should upper management move you to another part of

the company.

• **Establish credibility.** Don't do it by trying to convince your staff you're there to stay forever, but by tackling inarguable projects that can be completed in 18 months or less.

• **Double your job.** Make a second job of retaining your position. Be proactive about it. The forward-looking CIO will demonstrate to top management that business objectives come first and IS second. Elbow your way into the inner circle of senior executives, attending strategy sessions and committee meetings. Participate in your company's overall business.

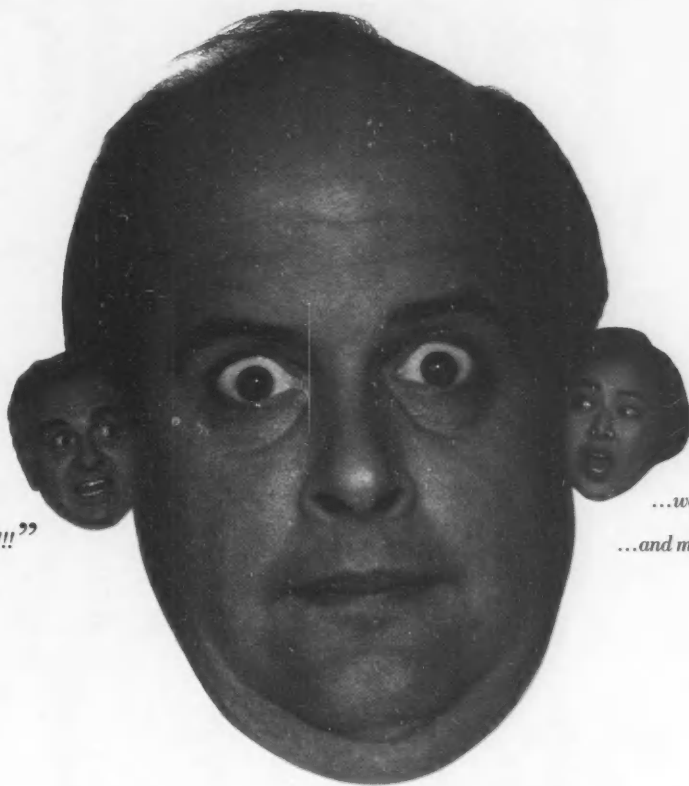
• **Communicate.** CIOs must have as much direct communication as possi-

ble with the people who expect services from IS. Learn upper management's expectations and how you will be rated in meeting these expectations.

• **Climb the learning curve.** By now, smart CIOs know that education is more important than ever. Companies want college-educated CIOs, not people who worked their way up the ranks. In qualification specifications sent to recruiters, companies are listing CIO requirements similar to those for a CEO: professional demeanor, ability to give presentations and so on. Strongly consider updating both technical and professional skills.

—Julia King

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# CIO turnover

CONTINUED FROM PAGE 86

base changes, you're in deep trouble," Standish says.

"The IS organization will continue to do what they think they're supposed to be doing, while the person on the top is constantly modifying direction, so there's always tension," he says.

All this politicking, he observes, makes for an unhealthy relationship between CIOs and IS staff members.

Some CIOs, like Standish, figure that it's just not worth it and leave. Some incoming CIOs try to heal the open wounds.

According to Ken Harris, vice president of worldwide information services at Louisville, Ky.-based Kentucky Fried Chicken, a division of PepsiCo, Inc., time and honesty are the only cure-alls for alleviating tension and for building trust with IS staffers.

"The first thing about stepping in brand-new is that you need to take stock of the internal IS customer base. You've got to know how happy they are. This will point up a lot of weaknesses and clue you in about where you need to focus your energy and resources," says Harris, who previously served as CIO at Taco Bell, another PepsiCo company, and before that at Security Pacific Information Services Corp.

"After that, the most important thing is to be absolutely clear with IS about the goals of the company, your personal goals and your expectations of the people who work for you," he says. "People working for you will either fall out or accept the freedom and openness that comes from knowing the rules, and the relationship of trust builds over time."

## Keep on talking

Other CIOs agree that communication is the best weapon to ease the high anxiety that inevitably accompanies high-level change in an IS organization.

"People always get anxious when there is a change, and communication is the best key to reassure people," says Susan Cramm, who moved into the CIO office at Taco Bell when Harris left. Part of her weekly routine is to meet one-on-one with IS staffers.

"The agenda doesn't have to be business. The idea is to let people get to know me personally," Cramm says.

Still, after 2½ years on the job,

Cramm says staffers ask her when she will be leaving.

"It's almost as though they can hear a ticker running," she says. "Given the industry, there's not a lot you can do to convince them you're staying. There will always be this sense of underlying instability."

"IS staffers just think you're passing through," says a former CIO of a \$4 billion technical services company in New York. "They get the same sense about their own jobs because it's happening to them, too."

## Major downsizing

In his first year as CIO, for example, this CIO, who requested anonymity, says his company went through five downsizings as well as a major relocation from Massachusetts to New York. "We went

from 110 people down to 50 people, and then we would hire staff for projects, then let them go when we had bad financials," he recalls.

In addition to communication, involving staffers in planning is critical to staff support, according to Kevin Moody, who was

a CIO at Gillette and then Bank of Boston Corp. before becoming an independent consultant.

"Getting people involved and participating is probably the most important thing," Moody says.

In 1990, during the massive reorganization at Bank of Boston, which, among other things, involved the departure of former CIO John Rodgers, "we involved hundreds of people in the planning process, so there was a lot of buy-in," Moody recalls.

At this stage, few are willing to bet when CIOs' luck will change. Most say that these days CIOs, like politicians, need to consider reelection a full-time job. Some offer advice (see story page 86).

## Master of all

The bottom line, according to Ditchfield and others, is the need to master technical, business and managerial disciplines.

"You can be the best technical person in the world and get systems engineering working, but without strong linkages with business, your vision remains just a vision," Ditchfield says.

And unfulfilled visions, he notes, are precisely the things that get CIOs fired. ■

King is a free-lance technology writer based in Ridley Park, Pa.

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# Calendar

## AUG. 22-AUG. 28

Interop '93, San Francisco, Aug. 23-27 — Contact: Interop Co., Mountain View, Calif. (415) 941-3399.

## AUG. 29-SEPT. 4

Annual International Gupta Developers Conference, San Francisco, Aug. 29-Sept. 1. — Contact: Gupta Corp., Menlo Park, Calif. (415) 321-9500.

Fed Micro '93 CD-ROM and Multimedia Conference and Exposition, Washington, D.C., Aug. 31-Sept. 2 — Contact: Tom Lauterback, National Trade Productions, Inc., Alexandria, Va. (703) 683-8500.

Structured Development Forum, Philadelphia, Aug. 31-Sept. 2 — Contact: Spirit Systems Consulting, Inc., West Chester, Pa. (215) 436-8290.

## SEPT. 5-SEPT. 11

Compuexpo '93, Las Vegas, Sept. 9-11 — Contact: UNSC Investment Group, Newark, Calif. (510) 657-3418.

## SEPT. 12-SEPT. 18

Expo '93 East, Atlantic City, Sept. 14-15 — Contact: C.S. Report, Inc., Uwehland, Pa. (215) 458-6415.

Engineering Document Management Systems, Anaheim, Calif., Sept. 14-16 — Contact: The Kalthoff Group, Cincinnati, Ohio (513) 871-8808.

## SEPT. 19-SEPT. 25

Mobile World, San Jose, Calif., Sept. 21-23 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3890.

Unix Expo '93, New York, Sept. 21-23 — Contact: National Blenheim Expositions, Inc., Fort Lee, N.J. (201) 346-1400.

Document World '93, Hartford, Conn., Sept. 22-23 — Contact: Key Productions, Inc., Hartford, Conn. (203) 247-8363.

## SEPT. 26-OCT. 2

OOPSLA '93: Conference on Object-oriented Programming Systems Languages and Applications (OOPSLA), Washington, D.C., Sept. 26-Oct. 1 — Contact: Association for Computing Machinery, New York, N.Y. (212) 869-7440.

IS As A Service Organization, Columbus, Ohio, Sept. 27-28 — Contact: Ouellette & Associates, Bedford, N.H. (603) 623-7373.

Imaging Expo, New York, Sept. 28-30 — Contact: Comtek International, Wilton, Conn. (203) 834-1122.

## OCT. 3-OCT. 9

The Ninth International Congress on Advances in Non-Impact Printing Technologies/Japan Hardcopy '93, Yokohama, Japan, Oct. 4-8 — Contact: The Society for Imaging Science and Technology, Springfield, Va. (703) 642-9090.

## OCT. 10-OCT. 16

Design/West, Anaheim, Calif., Oct. 10-12 — Contact: Karl Steidl, Reed Exhibition Cos., Stamford, Conn. (203) 964-0000.

Hypertext '93, Seattle, Oct. 14-18 — Contact: Association for Computing Machinery, New York, N.Y. (212) 869-7440.

CAD/CAM, CAE Reseller/Systems Integrator Strategy Workshops '93, Boston, Oct. 15-17 — Contact: Trish Griffin-Silva, Daratech, Inc., Cambridge, Mass. (617) 354-2339.

## Intelligence

## Files

## Pressing the people button

When it comes to implementing an imaging project, the strategic advantages are evolving from "having more" to "knowing more." With imaging, this knowledge is more than learning which button to push. It is a continuing search for functionality from the equipment and the people who use it. "Being smarter" is not something that happens all at once. It is part of an incremental process of improvement. Expect users to resist change, and try to educate them on the big picture rather than on simply how to use one part of the system.

Source: Special Report: Electronic Imaging's Impact on People, "Training: Programming the Peopleware," by Kathleen Hawk, Inform, January 1993.

## Lip service

Customer service may be the battle cry of the 1990s, but a new survey of 100 top corporations shows there is a wide gap between business talk and business action.

A big majority of the corporate managers

(87%) said they believe delivering value to customers is critical to success, but 70% said they judge customer service based on internal measures rather than customer measures (such as customer surveys). Furthermore, only 20% said employee compensation is tied specifically to customer satisfaction.

Source: Rath & Strong, Inc., Lexington, Mass., (617) 861-1700.

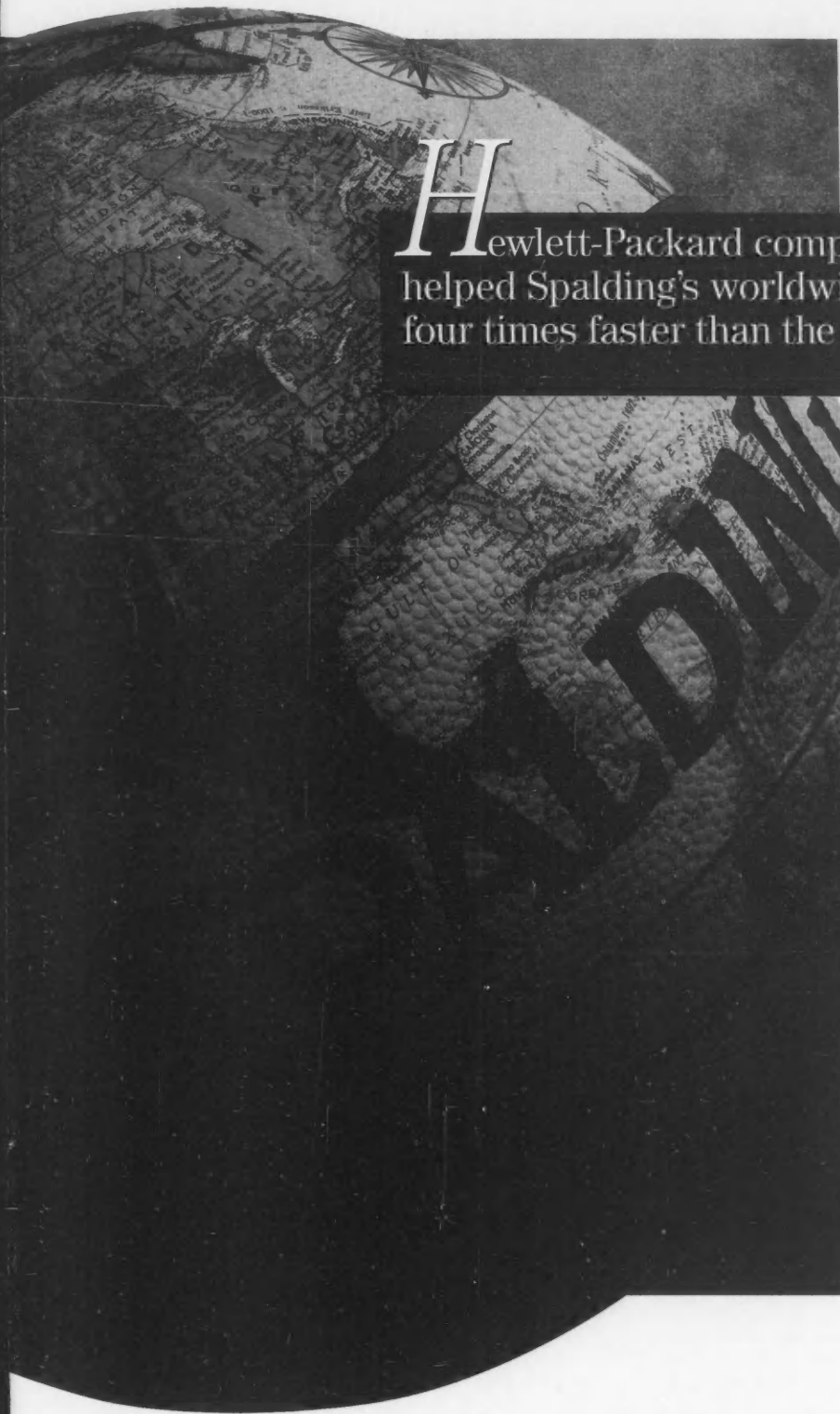
## Blaming consultants

Take a good look at yourself the next time you plan to hire an outside consultant. Less-than-spectacular results on your last project may be your fault, not his.

To determine if you're ready to get the most from a consultant, make sure you're not one of the following problem types:

- **The carper:** Antagonizes consultants by communicating solely with derisive remarks.
- **The disappearing act:** Senior management and staff back off after the initial commitment.
- **The switcheroo:** Changing the company's point person breaks trust and slows progress.
- **The foolish miser:** Penny-pinching during implementation is always a bad idea.
- **The amnesiac:** Forgetting why the consultant was hired is always disastrous.

Source: "Bemoaning the Rotten Client" by Anne G. Perkins, *Harvard Business Review*, July/August 1993.



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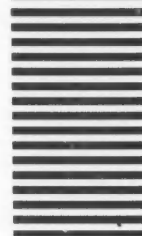
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# The CW Guide to LAN Disaster Recovery

# # & @ ! % \*

Next time, crash-proof your LANs with products that soften the blow and hasten business revival



**Cheyenne and  
Palindrome  
tape backup  
systems neck  
and neck in  
user satisfac-  
tion survey.  
Page 99**

Bad things *will* happen to your corporate LAN — more things, unfortunately, than you can hope to anticipate. Unlike the mainframe environment, where you're assured of centralized control and can develop an airtight disaster recovery plan, there will always be an element of chaos when something on the local-area network fails.

The biggest problem is the variety of things that can go wrong: Is it a file server crash, a faulty hard disk, a LAN card or a workstation? Is it an application error or a problem with the network or desktop operating system? There's no one product on the market that can tell you.

Occasionally, the source of failure is clear, such as in the case of a natural disaster, theft or sabotage. But here more than ever, recovery involves many disparate elements that neither an individual nor a single team could carry out.

In this Guide, we present the products and services you'll want to have on hand in the event of a crash or disaster — from those that help avoid data loss, such as tape backup, RAID and power control devices, to those that help you get back on your feet, such as recovery services and utilities.

By no means are these products going to solve all your problems; many are just now evolving to meet the needs of LAN-based systems. What's more, much of LAN disaster planning involves not products but innovation and foresight. LAN experts and users say it's most important to stay flexible and be on the lookout for constant change.



**Users of  
BusLogic's  
Chantal Disk  
Array  
Software  
especially  
like its  
nonproprietary  
nature.  
Page 101**

# The blast went off

shortly after noon, shaking the World Trade Center towers at their foundation and plunging hundreds of people into smoky darkness. As David Diaz emerged from the building to the relative safety of Manhattan's sidewalks, the reality of the terrorist bombing began to take hold. Amid his other swirling thoughts, Diaz wondered

## BY JOANNE CUMMINGS

if his recovery plan, implemented during the Persian Gulf war and tested several times since, would withstand the "real thing."

Quick recovery is important to Dean Witter, Discover & Co., a brokerage firm in New York. With roughly 70 Token Ring local-area networks, all anchored by 486-based IBM Personal System/2

Cummings is a free-lance writer based in Marlboro, Mass.

servers, Diaz, director of group information technology, had ensured that regular backups were done, tapes were stored off-site, power control devices were implemented and a contingency site was located should the building become inaccessible. But would it be enough?

Luckily for Diaz and his firm, the plan passed the test, and the firm emerged relatively unscathed. But for those schooled in mainframe recovery, Diaz's plan might appear less than bombproof. For instance, rather than regularly backing up every piece of data in the company, he backs up only the servers.

"We can't keep on top of everything," Diaz says. "We notify the users that they need to keep critical data on the servers. We own the servers and provide for off-site tape backup, but users are responsible for backing up their own hard drives."

Were the products available, Diaz could inventory each user's PC remotely and run the backup. But current automatic inventory software just can't deal efficiently with Dean Witter's thousands of end users and endless variety of PCs and configurations, he says.

As a result, some users learned a tough lesson. "Some people were backing up their PCs to a floppy they kept in their desk," Diaz says. "That didn't do them any good when we couldn't even get access to the building, which is really what they should have been planning for."

Diaz had made sure to manually collect PC configuration information from users to create a replica of its systems at another Dean Witter location. This was important since Diaz and his staff were allowed only limited access to the building after the bombing. "We do keep indexes on each server of

server-resident files, and we do inventory the applications and hardware resident on each PC regularly. Then we can ensure that after a disaster, users can at least have the proper setup."

Mainframers who value continuous operations might also balk at how Diaz views uninterruptible power supplies (UPS). While the most critical servers are plugged into UPSs with surge protection, the battery backups will last for only about one hour. The goal is not continuous operation throughout a disaster; it is merely to allow for an orderly shutdown of the LAN servers.

Although Dean Witter was up

## TIP

LANs change minute by minute, so you've got to allow for constant changes to your recovery plan. Just the same, it's impossible to track all the details. It's best to be aware of change and update the plan accordingly, but don't expect the same level of control as in the mainframe environment.

## 12 TOOLS TO KEEP YOU UP AND RUNNING

A well-designed, carefully implemented network is the first line of defense against local-area network disasters. If something does go awry, though, you need to have the right tools in your kit to minimize downtime, recover data and reconfigure your LANs.

### SERVER OR DISK REDUNDANCY

The major network operating systems support some level of file server or disk redundancy. For instance, Novell, Inc.'s NetWare SFT III provides server mirroring, where two file servers are linked via a high-speed connection so that if one server fails, the other keeps running.

Disk redundancy — where a disk drive failure does not stop file server operation — is less effective than server mirroring, but it costs less. There are two methods: disk mirroring and disk duplexing. Both provide redundant drives in a 1-to-1 ratio. Mirrored drives are usually attached to the same host bus adapter, while duplexed drives use separate adapters, providing extra redundancy.

Although the term RAID, or redundant arrays of inexpensive disks,

covers disk mirroring and duplexing, it most often refers to drive systems that allow the loss of a single drive in an array of three or more drives. Depending on the RAID system and operating system, performance can increase or decrease.

Although RAID systems provide less redundancy than mirroring or duplexing (and cost more), they are better than none at all. RAID systems are now supplied by PC manufacturers such as Compaq Computer Corp. and Dell Computer Corp. and by disk system vendors such as Micropolis Corp., Legacy Storage Systems, Inc. and Core International, Inc.

### DATA BACKUP

Backup is probably your most important tool for disaster recovery; if all else fails, you can at least get your data back. A data backup system allows you to copy data to a variety of media and then restore data that has been lost because of hardware failure, accidental file deletion, file corruption or other causes. The preferred medium is magnetic tape because of its low cost and high capacity.

Backup systems have a history of reliability problems; however, today's systems will provide reliable service as long as you follow proper procedures, including regular testing.

Traditional turnkey backup solutions — including a tape drive, a host adapter, cables and software — are available from vendors such as Mountain Network Solutions, Inc., Tecmar, Inc., Tallgrass Technologies Corp. and Conner Peripherals, Inc. (formerly Maynard).

Or you can build your own system by purchasing the software and adding your own hard drives. Major software vendors include Cheyenne Software, Inc., Palindrome Corp. and Legato Systems, Inc.

### POWER BACKUP AND CONDITIONING

PCs seem to be more tolerant of power glitches than mainframes, but you still need power protection. Uninterruptible power supplies (UPS) are generally used with network file servers and other critical components to allow for proper shutdown in a power outage. Line conditioners and surge protectors protect equipment

from power disturbances. Line conditioners "smooth out" and stabilize power, while surge protectors "clamp" extraneous voltages over specified values.

Unfortunately, nearly all available information about power protection is supplied by the power protection product manufacturers; there seems to be no good independent source of information. Major vendors of power quality products include Best Power Technology, Inc., American Power Conversion Corp., Network Security Systems, Inc., Clary Corp. and Panamax.

### VIRUS PREVENTION AND DETECTION SOFTWARE

Scanning programs, combined with user education, can help limit your virus exposure. However, no single program will eradicate or prevent all viruses. New viruses appear every day, so keep your software up to date. The numerous virus protection vendors include McAfee Associates, Inc., Command Software Systems, Inc., Intel Corp., Central Point Software, Inc. and Symantec Corp.

## The CW Guide to LAN Disaster Recovery

and running within 24 hours of the bombing, there were some minor glitches, and Diaz has since tweaked his policy. "We had been doing backups twice a week," he says. "After the bomb, we realized that recovering even two or three days' worth of data was too time- and resource-intensive. Now we back every server up onto digital tape and ship it off-site every day. Then you're looking at losing maybe a half day to restoring the data, which is easier to deal with."

As Diaz and many others have found, preparing for and rebounding from disasters affecting LANs is a whole different ballgame from the mainframe environment. With mainframes, you have centralized control and, should a problem occur, can fairly quickly determine the source of the problem. Not so in the fragmented, distributed LAN environment, where you just can't hope for the same level of prevention and quick recovery. Software to remotely monitor and inventory PCs — as well as to back up and restore data — on distributed LANs just does not exist. In addition, the disaster prevention

products available for the mainframe world, such as UPSs, tape backup devices and fault-tolerance features, are still evolving to support the fluid nature of LANs.

"The mainframe environment was simpler, simply because it was more controlled," says Houghton LeRoy, principal network engineer at The Foxboro Co., a manufacturer of process control systems in Foxboro, Mass. The company recently downsized from mainframes to about a dozen Unix LANs. "You knew exactly where the data was stored, which made it a lot easier to back up and recover in the event of a disaster," he says.

### Perhaps the biggest

difference in prepping for LAN disasters is that the master plan doesn't stay the same for long. Applications, configurations and critical data change so rapidly on a LAN that recovery plans can become obsolete within weeks of their being written.

"You constantly have to be testing your assumptions and revisiting the plan," says Dennis Sullivan,

**TIP**  
When purchasing LAN components, try to buy generic products that are easily replaced. If something blows, you won't have to hunt too far for a spare part. It will also be easier to duplicate your LAN at an alternative site in case of disaster.

van, vice president at Scudder, Stevens & Clark, an investment firm in New York. "You test that you have the right telephone numbers for your contact people and that they know what to do in an emergency. You also have to test whether this tape restores to this piece of hardware, and after that's done, can my users do their transactions? You test to see if your data looks good and if your reports reconcile."

At Dean Witter, exhaustive testing helped close holes in the recovery plan before disaster struck. "Basically, they were human problems," Diaz says. "People would save an old copy and lose the latest."

For some people, testing can reveal serious problems. Lee Tydlaska, president of Computer Conversations, Inc., a disaster recovery vendor in San Diego, says one of his clients was backing up its LAN servers daily, but the information saved was less than timely.

"The administration thought all the critical source code was on the network server and was being backed up nightly," he says. "We found out that the source code on the network was over a month old. The programmers said the LAN was too slow and was affecting their productivity, so they were keeping all of their data on their own workstations."

No company is exempt from this phenomenon: Users have so much control over LAN applications that it's not unusual for critical data to change physical location rapidly without warning.

"You have to tell end users, 'If we don't have this application, how will you get by for a day or two without it?'" Sullivan says. "You need a procedure so you can do that for every new application."

Disaster recovery, page 96

BY PATRICK H. CORRIGAN

### DOCUMENTATION TOOLS

Keep up-to-date records of your LAN configurations and procedures to follow when recovering from a crash. Useful products to this end include LAN inventory software such as Brightwork Development, Inc.'s LAN Automatic Inventory, programs that report user and security information and programs for writing disaster recovery plans.

Powerful, specialized documentation tools with long or difficult learning curves are easily forgotten and may be ultimately less effective than simpler tools, such as standard word processors and simple drawing programs.

### OFF-SITE STORAGE

Companies that provide off-site tape storage for mainframes now provide that service for LANs. Off-site storage providers will pick up your tapes, store them in a secure, temperature- and humidity-controlled building, then return them when needed. Response times vary, depending on your contract terms. Companies that offer this service include DataSafe.

### EMERGENCY EQUIPMENT ACQUISITION PROGRAM

Most hot sites operate on a first-come, first-served basis. That's why in a major regional disaster, you should have an emergency equipment acquisition plan in place. This is usually accomplished by negotiating with vendors in advance and having open purchase orders ready to avoid delays. When formulating your plan, consider the effect a regional disaster would have on potential suppliers.

### DISK AND VOLUME REPAIR UTILITIES

These are the first line of defense for disk-related problems. Some utilities, such as Novell's VRepair, are shipped with your network operating system. VRepair is used for repairing damaged NetWare volumes. Others are third-party packages, such as NetUtils from OnTrack Data Recovery, which recovers data from damaged NetWare server disks. Symantec's Norton Utilities and Central Point Software's utilities repair DOS volumes and recover deleted files. A word of caution: Always back up a disk or volume before a repair.

### DIAGNOSTIC AND TROUBLESHOOTING TOOLS

An abundance of these tools are available for PCs and LANs. Consider the following categories: PC diagnostics, such as Micro 2000, Inc.'s Microscope or Touchstone Software Corp.'s CheckIT; cable scanners such as those from Microtest, Inc. and John Fluke Manufacturing Co.; Simple Network Management Protocol-based network management systems; protocol analyzers such as those from Network General Corp., Novell and Intel.

### HOT SITE SERVICES

A hot site is a place to set up shop if your site is unavailable. A few traditional mainframe service providers, such as Comdisco, Inc. and Sungard Recovery Services, Inc., are beginning to provide for LANs. A hot site is generally equipped with a network, a file server, PCs and communications capabilities. Because LANs are generally more heterogeneous than mainframe systems, a LAN hot site may require significantly more planning. Keeping it up to date could also be costly.

### SPARE SYSTEMS AND COMPONENTS

Keeping available spare disk systems, file servers, hubs and workstations gets you up and running quickly following a disaster or crash. Keep spare components such as LAN interface cards and disk host adapters available to effect system repairs as quickly as possible.

### DATA RECOVERY SERVICES

The average failure rate of disk and tape systems is 100%; they will eventually all fail. If their failures occur at one time, you could have a major data loss. Services such as those from OnTrack can often restore data from damaged disks or tapes. One note: Line these services up before disaster strikes. Also, make sure the service is experienced at recovering data from the formats and operating systems that you use.

*Corrigan is the managing director at The Corrigan Group, a consulting and training firm in Sausalito, Calif. He is writing a book called LAN Disaster Prevention and Recovery (Prentice Hall). He can be reached via CompuServe at 75170,146.*

## The CW Guide to LAN Disaster Recovery

### As damaging as floods,

earthquakes and fires are, the more mundane disasters — power fluctuations and electrical outages — are more likely to take you out. That's where products such as UPSs, line protectors and power conditioners come in.

"We had a major thunderstorm come through, and we got a direct hit of lightning somewhere along the power lines," says Brad Hartz, systems administrator

at Food Service Equipment, Inc. in Fort Wayne, Ind. "But because we had the UPSs in place on the PCs and the phones, customer service remained operational until power was restored."

The one unprotected computer lost its hard drive, Hartz says. "The rest of the LAN didn't have a problem because we were able to isolate it with line suppressors." Line suppressors are units located on the cabling between each LAN device that isolate the devices if they detect

power surges or drags.

UPS vendors are working to make their devices more responsive to specific LAN needs. For instance, many UPSs, including those from American Power Conversion, Inc., Tripp Lite and Best Power Technology, Inc., include software designed to close files, log out users and gracefully shut down the LAN.

UPS software also increasingly allows some degree of power management from a single centralized location. Robert

Frowenfeld, business systems manager at House of Seagram, a division of Joseph E. Seagram & Sons in White Plains, N.Y., uses optional Novell, Inc. NetWare Loadable Module software that allows him to remotely monitor server power levels and unit temperatures.

However, says Patrick H. Corrigan, managing director of The Corrigan Group, a LAN consultancy in Sausalito, Calif., some holes remain. "They won't update partially updated databases. If

### Make sure you . . .

- Document your procedures (such as backup and restore, user setup, etc.) and systems in such a way that nontechnical people can use them during an emergency. Include names and phone numbers of key staffers and technical support personnel.

- Write a recovery plan that addresses the effects of disaster more than the causes. For example, concentrate on what you must do if your office or building becomes unavailable instead of what to do in the event of a flood, earthquake or fire.

- Test, test and retest your system backups to be sure the backup copies of your data are usable.

- Use disk or server redundancy if you cannot afford more than a few hours of downtime.

- Maintain system security, not just to prevent unauthorized access or sabotage but to avoid accidental damage.

### But don't ever . . .

- Trust your data backup systems. Test them regularly and occasionally back up critical files to alternate media.

- Rely totally on redundant servers or drives. Even with the best-laid plans, the unexpected can happen. Make sure you have a repair plan in place.

- Run repair utilities or operations — such as partitioning, formatting or reinitializing — on hard disks until you verify the viability of your backup tapes. Data recovery services can often recover data from damaged disk drives. They cannot recover that data, however, if it has been removed or overwritten.

- Go overboard on security. Effective security requires the cooperation of users. Going overboard will prevent you from getting that cooperation.

- Assume your mainframe disaster recovery techniques will apply to LANs. The data center is an entity in itself, whereas LANs are intertwined with business operations. They are a data highway, not a data resource.

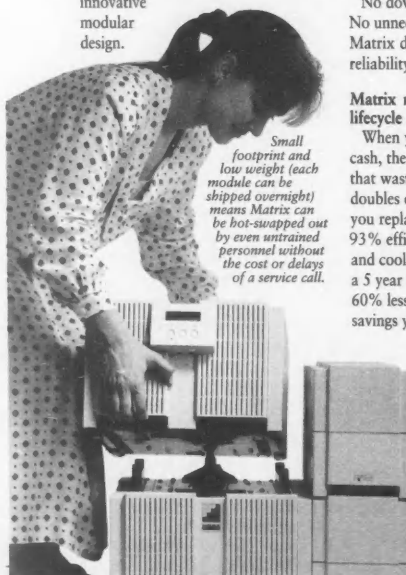
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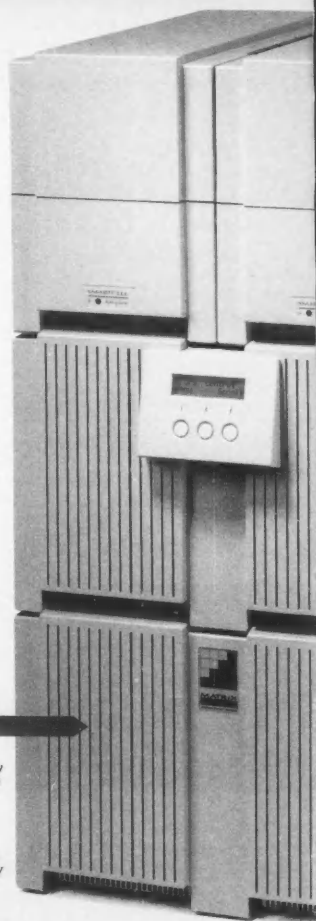
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you have workstations updating database files, you have to make sure the application can deal with a partial update." Users must program rollback capabilities into their database applications.

UPS vendors are lagging in support for the Simple Network Management Protocol (SNMP). While they support their proprietary MIBs, or Management Information Bases, they have yet to agree on a standard, cross-platform MIB.

With falling prices, it's becoming more

practical to put UPSs on the LAN. "You can get a no-frills UPS with 10 minutes of battery time for maybe \$100," Frowenfeld says. "But a really good UPS with the software and everything costs maybe \$400 to \$900. It makes sense to spend a little extra and get the protection."

### Once the disaster is over,

users and consultants say the recovery products needed are straightforward.

### TIP

LAN recovery cannot be accomplished by an individual or even a single group. Rather than form a large committee consisting of everyone responsible for network management, divide responsibility among smaller groups. Similarly, break out your recovery plan into many little plans.

"Whatever you had in place for the LAN installation is all you need to bring it back up," Diaz says. "It's really not that complicated if you have the proper UPSs, backup tapes and equipment in place."

But recovering from a disaster is less a matter of service firms and products than planning. You can have perfectly backed-up data, but if you can't restart the business, you could lose it. Disaster planning is a lot like defensive driving: Always leave yourself an alternative. ■

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10 HP 6000s w/19" mon.	5000	10	
15 386/33s w/VGA	5000	10	
4 Sun 4/490s	5000	11	

For midrange systems...

Systems	Std	Matrix	Std Runtime
2 DEC Vax 4000-500s	3000	12 minutes	
3 HP 9000s	5000	11	
IBM AS/400	3000	13	
Sec 3406 E45 proc., 9337 DASD, 7208 tape, 3477 dis.			

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And of course, Matrix is backed by a suite of award-winning support programs, including a two-year warranty, 24x7 toll-free tech support, a CompuServe forum, software upgrades, and more.

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## Now's the time



When should you start developing a disaster recovery plan? When you start engineering the LAN environment.

If you wait, recoverability becomes a monster.

For most companies, a distributed network environment grows out of smaller systems, each engineered by someone different, and then the decision is made to tie them all together. Only then does someone ask, "What will we do when it crashes?"

Just imagine if you started planning from the beginning. If all the LANs in the internetwork were compatible, there would be little difference between recovering operations in a small LAN environment and in a large distributed environment. There would be less documentation than with a vast distributed network.

If all the systems were compatible, you could plan for one environment and, with minor tweaking, have a plan for the whole distributed network.

Many of us don't have the luxury of starting from scratch, of course, which means we struggle with complexity and incompatibility. Luckily, there are some products that try to make our lives easier, such as network monitoring tools. These tools monitor disk capacity, transfer rates and hardware status and let you know if things are getting out of hand so you can take appropriate action.

As you're reading this, there's a good chance that your computer is down. Just think—if you'd had some network monitoring equipment, you might be up and running. Not to mention that you're probably paying now in unbillable time what it would have cost to purchase some of this equipment.

William Krouslis is assistant vice president of management planning services at Chubb Services Corp. He recently spoke on this topic at the Downsizing Conference in Santa, Clara, Calif.

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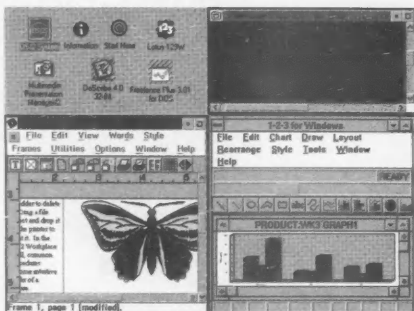
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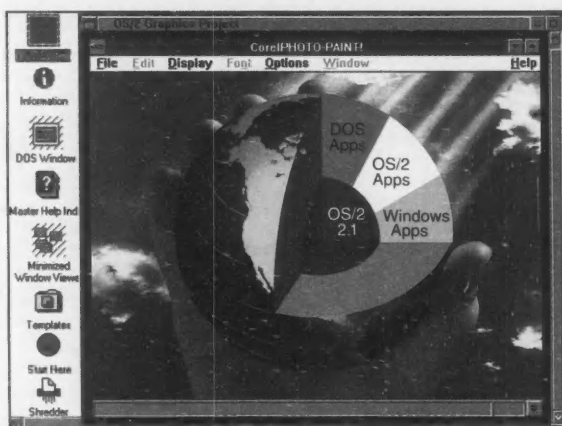
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# Cheyenne's backup software rates highest in overall user satisfaction

By Kevin Burden

Backing up your data is one of the most important steps in complete disaster recovery. A lightning bolt may take out your file server, but if you've made sure you've done your backup right — which requires testing, testing and testing again — you can at least restore what you've lost.

But only 20% to 30% of local-area network users make a concentrated effort to do backup properly, according to estimates by consultant Patrick H. Corrigan at The Corrigan Group in Sausalito, Calif.

Among those users who take backup seriously, reliability is the No. 1 attribute they want in their LAN backup software, according to 178 respondents to our Buyers' Scorecard survey on LAN backup products.

The following market-leading products were included in the survey: Cheyenne Software's ARCserve, Palindrome's Network Archivist, Maynard Electronics' MaynStream and Emerald Systems' Xpress Librarian.

Stream and Emerald Systems Corp.'s Xpress Librarian.

Intel Corp.'s new backup program, Storage Express, is likely to pose a challenge because of the vendor's marketing power, but the product has not been in the market long enough to build the sizable user installation required for inclusion in this Scorecard.

Setting its sights on the reliability requirement, ARCserve received the highest overall satisfaction ratings from its users, with a score of 73. Network Archivist received the second highest overall score, 72. MaynStream scored third-highest with 66, and Xpress Librarian came in fourth with a score of 61.

Cheyenne's ARCserve scored its highest rating in the category of reliability: an 8.2 on a 10-point scale. Users rated the product high for its support of multiple tape drives. ARCserve is capable of controlling up to seven drives via one Small Computer Systems Interface adapter. Users also said the product had major strengths in its ability to keep multiple copies and track the history of a file.

Palindrome's Network Archivist scored a reliability rat-

ing of 8.7 — the highest of the four competing products. Accompanying its high reliability mark was a similarly strong rating for error handling, another critical feature cited by users in which Network Archivist posted a 7.5.

Topping only one specific rating area — quality of vendor support — Maynard's MaynStream produced average marks down the line. Users noted that the product is sometimes sluggish and clumsy in accomplishing restoration of files, and it lacks the ability to effectively back up multiple drives.

Emerald's Xpress Librarian scored lowest in data integrity and error handling. But it did post the highest rating of the four products for its ability to simultaneously back up multiple servers and clients.

Buyers' Scorecard records users' satisfaction with their installed technologies. Users assigned a 1-to-10 rating based on their satisfaction with their LAN backup software in 17 categories. All categories were factored into the final scores. The scores for each product in the six most important categories are listed in the charts.

## Overall scores

Cheyenne Software's  
ARCserve

SCORE  
**73**

Palindrome's  
Network Archivist

SCORE  
**72**

Maynard Electronics'  
MaynStream

SCORE  
**66**

Emerald Systems'  
Xpress Librarian

SCORE  
**61**

## METHODOLOGY

User names were obtained from nonvendor sources. First Market Research Corp., an independent market research company in Austin, Texas, conducted the survey and tabulated the results. The response base was 178.

Users rated their satisfaction with their installed products and were not asked to compare or rate one product directly against another.

To compute the overall score for each product, we performed the following steps:

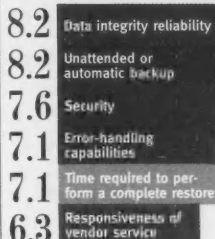
- 1) Multiply the product's score in the first category by the user importance rating for that category to obtain the weighted score.
- 2) Repeat the process for all remaining categories.
- 3) Average the resulting figures for the average weighted score.
- 4) Convert the average weighted score to base 100; the ratio of the average weighted score to the average user importance is equal to the ratio of the overall score to 10. Numbers were rounded off where necessary.

## ACKNOWLEDGMENTS

Computerworld thanks the following individuals and firms for their assistance in preparing this Buyers' Scorecard: Computerworld Database Division; Fara Yale, Dataquest, Inc.; Steve Lewis, Systems Audit Group.

### Cheyenne Software's ARCserve

RESPONSE BASE: 50 USERS



RATINGS ARE BASED ON A 1-TO-10 SCALE, WHERE 10 IS BEST.

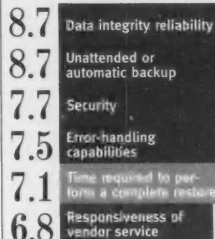
#### Would you buy the program again?



REASONS ARE BASED ON THE MOST FREQUENTLY STATED ANSWERS.

### Palindrome's Network Archivist

RESPONSE BASE: 50 USERS



RATINGS ARE BASED ON A 1-TO-10 SCALE, WHERE 10 IS BEST.

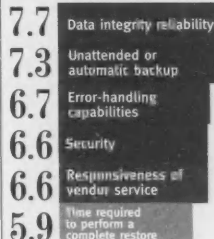
#### Would you buy the program again?



REASONS ARE BASED ON THE MOST FREQUENTLY STATED ANSWERS.

### Maynard Electronics' MaynStream

RESPONSE BASE: 50 USERS



RATINGS ARE BASED ON A 1-TO-10 SCALE, WHERE 10 IS BEST.

#### Would you buy the program again?



REASONS ARE BASED ON THE MOST FREQUENTLY STATED ANSWERS.

### Emerald Systems' Xpress Librarian

RESPONSE BASE: 28 USERS



RATINGS ARE BASED ON A 1-TO-10 SCALE, WHERE 10 IS BEST.

#### Would you buy the program again?



REASONS ARE BASED ON THE MOST FREQUENTLY STATED ANSWERS.

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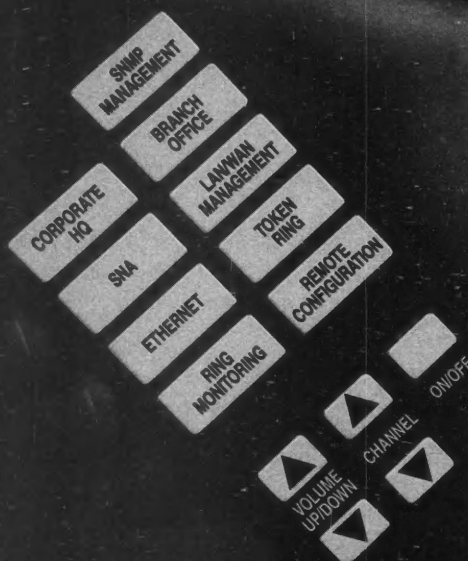


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ROUTERS

NETWORK  
MANAGEMENT



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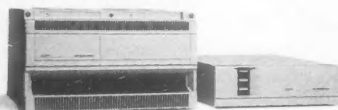


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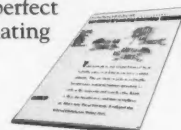
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# BusLogic's Chantal

## offers inexpensive RAID capability with high performance, reliability

### Chantal Disk Array Software

■ Evaluators said BusLogic, Inc.'s Chantal Disk Array Software provides inexpensive and reliable RAID-5 performance with a range of Small Computer Systems Interface (SCSI) disk drives and SCSI host adapters.

■ While generally pleased with the Chantal software, evaluators wished for better documentation and more management options.

It was only five years ago that the now-familiar concept of redundant arrays of inexpensive disks (RAID) was first proposed by researchers at the University of California at Berkeley. The idea caught on quickly, and today dozens of manufacturers offer a multitude of RAID alternatives.

Of course, systems managers, not academics, drove the movement toward RAID. The reasons are simple: better performance, robust data security, improved data redundancy and fault-tolerant operation. By definition, RAID provides a significant alternative to off-line tape backup systems (see Scorecard, page 99).

So why doesn't everyone use RAID? Unfortunately, many RAID

offerings are packaged solutions of hardware and software that suffer from an insurmountable problem, at least in the eyes of users: They are proprietary "black boxes." And anything smacking of "proprietary" does not play in Peria these days.

Fortunately, a handful of companies are offering software-only RAID solutions that take advantage of another trend in hard disk storage: the ubiquitous SCSI. Combine standard SCSI hard drives with good RAID software and you can have a plug-and-play, home-grown RAID system.

For this Firing Line, *Computerworld* surveyed four evaluators working with current and beta-test versions of San Diego-based

BusLogic's Chantal Disk Array Software. The software, which supports Novell, Inc. NetWare v3.11 servers, is due for a major upgrade to Version 4.0 this month. The new version will support NetWare 4.01 and will offer a number of new performance and maintenance features.

Chantal RAID Version 3.0 supports RAID levels 0, 1 and 5 on NetWare v3.11 servers. RAID-0 provides better performance than conventional disks through a technique called "striping," which interleaves data across an array of conventional SCSI disks. All disks appear as a single unit. RAID-1 provides a real-time data backup in the form of "mirroring," which automatically writes a second image of all disk data to a set of backup drives.

RAID-5 provides high-data redundancy and fault tolerance through striping and other techniques. Typically, RAID-5 is used when total reliability is at stake. RAID-5 systems will automatically switch to a backup drive should the primary drive fail and will also attempt to reconstruct the faulty drive on a spare backup unit.

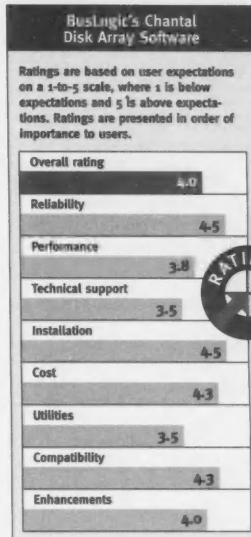
The evaluators participating in this survey included technical staff at a university, an auditing services firm, a petroleum company and a large hospital. All were using Chantal RAID in NetWare v3.11 environments for six months to two years and were supporting from 25 to 800 users.

In all, the evaluators gave Chantal RAID an overall rating of 4.0, meaning that the software delivered better performance than expected.

The format for this survey was created with the assistance of Howard Rubin Associates and Technology Investment Strategies Corp.

#### Reliability

Although RAID implementations are generally deemed far more reliable than conventional storage systems, questions have been raised in the storage industry about the integrity of homegrown, software-based RAID systems. The evaluators disputed these concerns, saying that Chantal RAID had consistently delivered



reliable performance. All of the evaluators had experienced at least one hard disk failure, with Chantal RAID recovering from the error as expected.

Hospital: "Version 4.0 is an improvement. It never died on me or gave me a data error."

Petroleum company: "I would have expected problems with software RAID because it requires serious code, but the problems didn't exist."

University: "During the course of setup, I pulled the plug many times, sometimes on purpose and once or twice by accident. [The server] still came up. No user was aware of a problem."

#### Performance

Only the university evaluator had run formal benchmark tests on Chantal RAID and found performance to be adequate. The petroleum company evaluator was running RAID-0 (using data striping) solely to increase performance on a 16G-byte desktop application server. He said he was pleased with the results. Performance took a backseat to reliability and data integrity for the auditing firm and the hospital.

Hospital: "I have yet to push it Chantal, page 102



### Installation descriptions for users who evaluated Chantal Disk Array Software

	Hospital	University	Petroleum company	Auditing firm
Total RAID servers	4	3	1	2
Total RAID storage	28G BYTES	4G BYTES	16G BYTES	12G BYTES
Length of use	6 MONTHS	1.5 YEARS	6 MONTHS	2 YEARS
Using beta 4.0 for	1 MONTH	1 MONTH	PREPARING	PREPARING
SCSI controllers in use	ADAPTEC 1742	ADAPTEC 1742	ADAPTEC 1742	ADAPTEC 1742
SCSI drives in use	MICROPOLIS 2112	FUJITSU, MICROPOLIS	MICROPOLIS 1924	SEAGATE
RAID level(s) used	5	5	0, 5	0, 5
Applications under RAID	PATIENT ACCOUNTING, QUALITY ASSURANCE	DESKTOP APPLICATIONS	DESKTOP APPLICATIONS	DESKTOP, AUDIT APPLICATIONS
Users on RAID servers	800	180	150	50

# Evaluators say Chantal RAID installation is simple but better documentation is needed

CONTINUED FROM PAGE 101

because there has been no bottleneck at the RAID software."

University: "I did some Norton [Utilities] benchmarks and other throughput tests. It's faster when you have multiple users."

Auditing firm: "Under RAID-5, performance dropped. RAID-0 was 25% to 50% faster than Novell's striping capability."

## Technical support

The evaluators were very pleased with technical support, saying that calls were handled efficiently and accurately. The hospital and university evaluators concurred that improvements in technical documentation would reduce their needs for telephone technical support. Nonetheless, they agreed that support was very good.

Hospital: The support technicians "always answer questions concisely. But calling them once every two weeks does get tedious."

Petroleum company: "I have high expectations of [vendor] support, and they met those expectations. Very helpful, and they understood my questions."

University: "They were notably good at following up, which puts them immediately into the top 20% of any vendor I've dealt with."

## Installation

None of the evaluators required more than a few hours to configure and install the Chantal RAID software. Any installation overhead was caused by locating the required parameter information for hard disks and controllers; additional time was needed to format the hard disks used in the system. None of the evaluators con-

sidered this to be part of the Chantal RAID installation, per se.

Hospital: "It was a breeze. Easier to install than Word for Windows."

Petroleum company: "Novell add-on products are, as a rule, easy to install, and this was no different. It took four hours."

Hospital: "It took about 1½ hours. You have to know EISA configurations, port addresses and the drive types you have. Actual installation once you know all of these parameters is 10 minutes."

Auditing firm: "A piece of cake. Tops is 30 minutes. You could do it following the manual step by step."

## Cost

The hospital, university and auditing firm acquired Chantal RAID either through hardware bundling deals or through site licensing. Thus, the evaluators had no detailed measure of actual costs. The petroleum evaluator considered the software very inexpensive compared with proprietary RAID systems, as did the three other evaluators.

Hospital: "We got it as a bundle with our [storage] hardware."

Petroleum company: "It's dirt cheap if you have the disks in-house already. A packaged system still delivers proprietary software that may not decrease in price as the price of disk

stalled base is as large as or larger than any hardware product on the market today. Therefore, it is our customers' strong acceptance of software-based RAID that has positioned Chantal RAID as the market leader in disk array software technology.

► **RAID-5 limitations:** RAID-5 is ideally suited for transaction-oriented applications. RAID-5 involves extra checking whenever new data is written, and it may slow down some operations. RAID-0, on the other hand, can produce faster performance but does not provide the fault tolerance required in an enterprise computing environment. Compared with most RAID-5 solutions, Chantal RAID is an exceptional performer because it uses Intelligent Stripe Job Combination. Aside from this technical trade-off, there are no reasons not to choose RAID-5, especially if affordable fault tolerance is the prime consideration.

► **Usage profile:** Chantal RAID is currently in service at major banks, airlines, television stations, law firms, stock exchanges, oil companies, automotive manufacturers and elsewhere.

## BusLogic responds

*BusLogic officials provided the following responses to issues raised in this evaluation:*

► **Software-based RAID:** BusLogic's Chantal Disk Array Software is a proven fourth-generation RAID product that delivers exceptional features and complete fault tolerance to the customer. In addition, its performance is highly competitive with any hardware solution on the market.

► **NetWare 4.01 and Chantal RAID:** Chantal RAID, Revision 1.0, will comply with NetWare 4.01. The final version will shortly be made available to our users. Because the changes are minor, there are no differences to the user in performance or operation.

► **Adoption of software RAID:** BusLogic ships as much disk array software as any hardware RAID manufacturer in the market. Comparing our shipment number with the latest Disk Trend RAID report, our in-

Chantal features

- Supports RAID 0, 1 and 5.
- RAID levels can be mixed on a single server.
- Hot Spare feature allows on-line rebuild to back up drives.
- Supports most standard SCSI drives and SCSI host controllers.
- Runs with Novell NetWare v3.11 and 4.01.

drives goes down."

## Utilities

Evaluators said Chantal RAID came with sufficient tools, utilities and diagnostic programs. The university, hospital and auditing firm evaluators wished for a better disk-rebuilding utility. They said the current version takes too long to operate (approximately 20 to 50 minutes), during which time users are barred from using the server.

Hospital: "It went into off-line rebuild mode, which took 50 minutes to complete. [During that time], my users were down, which I thought was less than acceptable."

Petroleum company: "The configuration program is not as robust as desired. The menuing conforms with standard NetWare utilities."

Auditing firm: "They're sufficient. There are 10 other command line utilities which we hardly ever use, but they're good for diagnostics if you need them."

## Compatibility

Compatibility with industry-standard SCSI drives and controllers was the primary reason for using Chantal RAID, according to the evaluators. They reported it was slightly more compatible than expected.

Hospital: "It didn't care what the disks were."

Petroleum company: "We chose it specifically because of its compatibility with any SCSI drive and multiple SCSI adapters."

University: "It was fussy with the controllers, and you have to be careful with the configuration. But the really fantastic thing is that we can pick our own drives."

Auditing firm: "With software RAID, you can use anybody's drive and anybody's [SCSI] card."

## Enhancements

The primary enhancement to be made to Chantal RAID Version 4.0 is support for NetWare 4.01. All evaluators were anticipating an eventual move to the new network operating system. The evaluators also expressed interest in reported improvements in rebuild times and better reporting and statistics to be delivered with Version 4.0 diagnostic programs.

The new Hot Swap feature will allow Chantal RAID users to swap in a spare drive should an operating drive fail.

Petroleum company: "It does its job, and it does what RAID software is supposed to do."

University: "They made it a little bit more idiot-proof [in Version 3.0], which I didn't like. I want to have more control."

Auditing firm: "We'll use the Hot Swap in RAID-5. Otherwise, you have to shut the whole thing down to install a new drive."

Reported and written by Computerworld senior editor Garry Ray.

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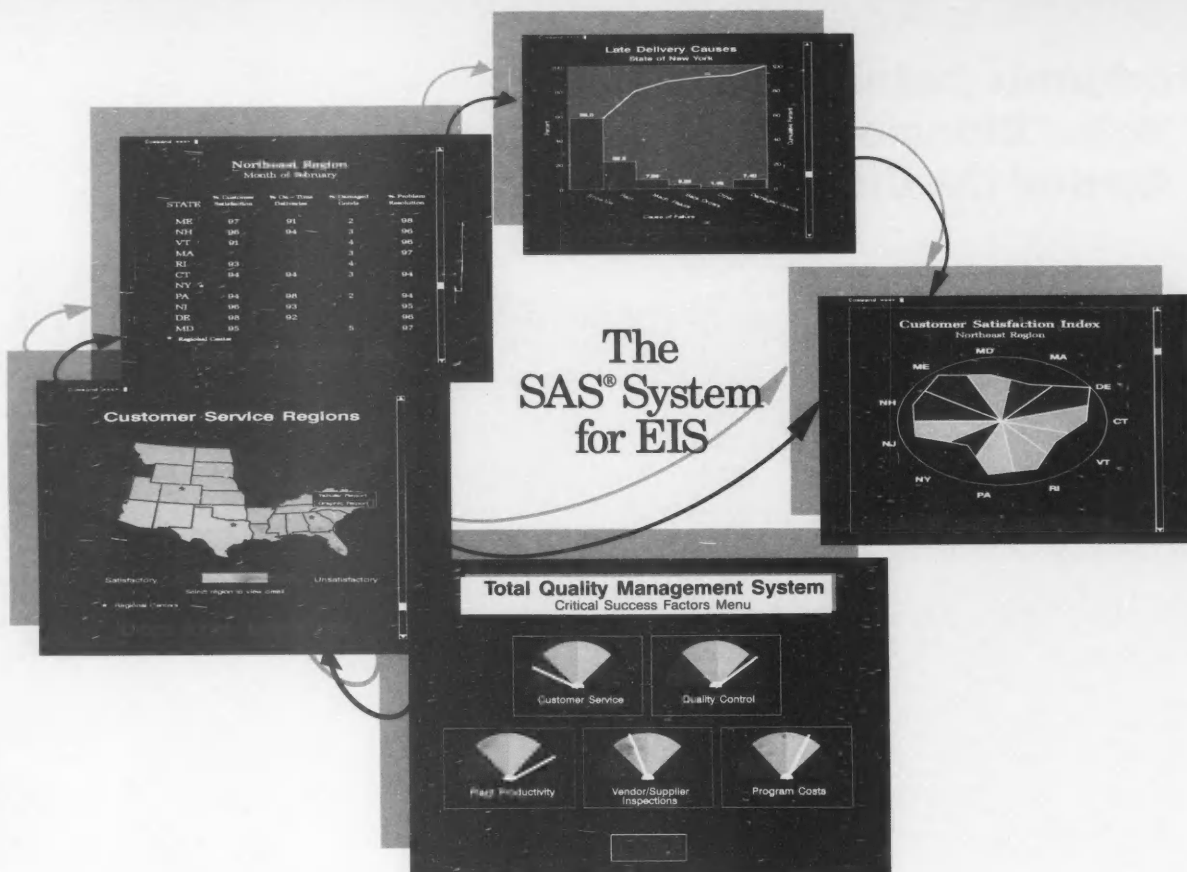
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# In Depth



LEW WILSON

# LOOK WHO WANTS YOUR SERVICE BUSINESS

**W**hen Steelcase, Inc. was looking for a third party to help it set up and manage a wide-area network that included 4,000 workstations, 26 operating systems and several networks, it didn't turn to the EDSs and Andersen Consultings of the world. Rather, the office furniture supplier went with a PC retailer-turned-service provider.

Steelcase's experience isn't unique, and companies like it have helped spur PC retailers' transition in the last five years from primarily PC hardware and software sellers to purveyors of setup, support and service for PCs, local-area networks and WANs.

Players such as MicroAge, Inc. in Tempe, Ariz., JWP, Inc. in Rye Brook, N.Y., and Computerland

**PC retailers are aggressively moving into the ranks of soup-to-nuts desktop service and support providers. Their pitch? A keen understanding of LAN and WAN issues and cost-savings over large outsourcers.**

Corp. in Pleasanton, Calif., hope to capitalize on corporate customers' interest in desktop expertise.

Unlike the "big outsourcers," these companies tackle problems from the bottom up, an important point as LANs, WANs and client/server computing proliferate. Customers may have turned to these providers initially for large quantity purchases of PC hardware and software and returned when these wares needed to be linked together or with larger machines.

For instance, Steelcase, which is using MicroAge on its WAN project, has been a customer since 1985. It bought 2,000 PCs through the company in the last 12 months and plans on buying another 2,000 in the next 12 months.

Companies want specialists who can handle the soup-to-nuts care of what are small systems but big investments. (A 1993 Gartner Group, Inc. study revealed that while a PC, including software, might cost a company \$5,000 initially, when you factor in costs for maintenance, network integration, design, installation, support and training over five years, that price tag jumps to \$40,000.)

*Service business, page 106*

## MANAGER DEMANDS

When it comes to service provider skills, technical managers want problem-solvers

### TOP ISSUES IN PROVIDING NETWORK MANAGEMENT SERVICES:

- ① Fault isolation and resolution.
- ② End-user support management.
- ③ Performance measurement and management.
- ④ Configuration and reconfiguration management.

Base: 450 corporate network managers

Source: International Data Corp., Framingham, Mass.

## Service business

CONTINUED FROM PAGE 105

Cost is also an issue. Large systems integrators have built their organizations on 30% to 35% gross margins, says Ed Drohan, a consultant who has compared service provider costs for the banking industry for 18 years. Providers that come from retail have margins more on the order of 20%. Slimmer margins translate into lower costs for users, says Joel Orr, a consultant and president of the Virtual Worlds Society.

### A unified team

For some firms, a one-stop contact point for the myriad desktop issues provides great relief.

"We wanted to get out of this mode where we are negotiating each PC deal and pitting each vendor against each other," says Chuck Boll, lead information center specialist in the information services group at Cummins, Inc., a \$4 billion engine manufacturing company in Indianapolis.

What Cummins wanted was a partner that had desktop experience to handle PC- and LAN-level issues and that could sit in on meetings and planning sessions.

Some IS managers "don't have enough resources to deal with the complexity of migrating to new environments at the PC level, as well as managing the details," says Glenn Miller, vice president of client services at JWP. "You don't want to burn out [IS] managers tracking serial numbers on 2,000 PCs."

Besides taking the load off personnel, Cummins looked to the service provider to cut costs. Through the company, Cummins was able to negotiate a volume purchase agreement with Microsoft Corp. that saved it \$200,000. Furthermore, in the first month of its contract, Cummins consolidated companywide billings on a monthly basis and freed up the time of three Cummins purchasing clerks. "The old system was out of control," Boll says.

According to Orr, some companies turn to these PC and LAN experts for help in keeping up with the rapid rate of change on the desktop, which can include swapping out machines every 12 to 18 months. "In-house bureaucracies can be inefficient," Orr says. Sometimes it takes an outsider to work around entrenched layers and get things done faster.

Take Rumger Insurance Co. "Doing business with us was a long, agonizing process," says Dustin Cole, vice president of marketing at Rumger, a malpractice insurance firm in Orlando, Fla. It took three weeks to complete a sales cycle, which encompassed the time from a salesperson's first client contact to delivery of the policy paperwork.

While the company was in the fortunate position of having a lot of prospects, the paper chase it put them through drove some

away. When the company decided to try Lotus Development Corp.'s Notes to streamline the process by developing a telesales and telemarketing system, the IS department handed responsibility to a third-party retailer for the job. The service provider handled hardware and software purchasing and training, as well as implementing interfaces to the company's IBM Application System/400.

The system, which included faxing forms directly into Rumger's system, was up and running in less than 90 days, Cole says. The speed with which the project came together had a lot to do with the provider's "outside" status.

Today, it takes only one hour for a salesperson to cement a deal and finish the paperwork, he says.

### Sleazy service providers?

The heat is on in the services segment of the market, but customers need to watch that they don't get burned. Some providers may do anything to get a piece of the services market pie, which, according to International Data Corp. (IDC), is expect-



Chuck Boll wanted a partner with desktop experience

## Not everybody's good at service

At minimum, you should look for the following expertise in a retailer/service provider:

**Procurement.** A good company will help lower procurement costs by automating ordering and billing. The company can help save time and money on procurement by providing on-site purchasing specialists to assist clients in product selection, configuration and price quotes as well as using electronic ordering systems and electronic data interchange capabilities.

**Configuration, logistics and installation.** You should be able to get PCs configured any way you want, delivered to your desks and installed.

Other configuration services often include LAN/WAN testing, in which the provider tests newly configured equipment on a customer's WAN before it is boxed and shipped. Customers should be able to specify specialized packaging and shipping procedures, asset tagging and software licensing reporting.

Some providers are certified by hardware manufacturers to manufacture their products to order from subassemblies. This reduces the delivery cycle time of configured systems.

**Adherence to quality procedures.** Quality procedures are critical in configuration services and in delivering orders at a specific time and in specific configuration. Look for visibly active quality initiatives. Before awarding a supply contract, Cummins went to visit each supplier. "They all talked about quality and service," IS staff member Chuck Boll says, "but our team wanted to go to their facilities to see whether that was really the case."

**National service.** The provider should have a network throughout the U.S. that can provide maintenance for any customer site.

Also important is a single point of contact for dispatching other service organizations to do mainframe, midrange or other systems maintenance. This approach consolidates and simplifies the support for users.

**Technical support.** The provider should be able to give comprehensive technical briefings about emerging technologies, new products and their impact.

It should be able to provide LAN/WAN recommendations and do product evaluations, as well as provide project consulting, remote diagnostic support, a direct line into manufacturer technology lines and help desk support.

**Specialized services.** Efforts might include project management for pilot efforts, branch automation, international project and services support, customized reporting, asset management and strategic planning support.

ed to reach \$81 billion by 1997. Small systems integrators (a group that includes retailers) have high hopes: They want 40% of their 1994 revenue to come from network services, an IDC study revealed.

"You have to shop for quality when you choose," Orr says.

Boll agrees. Whenever he is choosing a third party, which typically takes about

eight months of research, quality is high on his list. Boll has created a literal list of "bombs" — key provider snafus during the evaluation process that destroy any interest Boll may have in using them (see story below).

Guignat is a free-lance writer and marketing specialist in Scottsdale, Ariz.

## Bombs away!

Chuck Boll and his group at Cummins have become masters at selecting service providers.

With the ranks of retailers that now claim to be service providers swelling, Boll says picking carefully has become vital.

Boll, lead information center specialist in Cummins' information services group, credits Toyota Motor

Corp. and its quality methods with inspiring him to select only those prospective service providers that pass muster.

Cummins' six- to eight-month selection cycle can be scuttled if the vendors do the following:

- **Hold fluff-filled initial presentations.** The warning sign is if the vice president of marketing is in charge of giving the talk. If, however, the company brings in a management team, preferably the people who will actually handle the account, that's a positive.
- **Offer weak references.** Boll tells the story about going on-site at one reference company that slammed the provider. In fact,

### SERVICE BOMBS

If your prospective service provider exhibits any of the following traits, run like hell:

**Initial presentation that's all fluff.**

**Poor or nonexistent references.**

**Shoddy facilities and apparent lack of quality methods.**

that disgruntled reference ended up flying to Cummins to learn about its selection techniques.

• **Show lack of on-site quality.** Boll goes on-site to any provider he is serious about. Does the site adhere to ISO 9000? Does it let the user load and run software from the site? Is the manufacturing facility a clean-room environment? Will service include 24-hour access to all equipment in the right configuration?

Perhaps the biggest burden, however, rests with the evaluator. Boll says it is imperative that companies know what they want so they don't contract for what they don't need.

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# Computer Careers

## Blazing network trails



By Joe Panepinto

UNTIL RECENTLY, network management was the kind of career that information systems personnel stumbled upon when looking for something else. In fact, many of the folks managing networks today are pioneers of a sort — the first generation of IS personnel to set sail for the great glass house and get tangled in coaxial cable along the way.

Recognizing that these veterans have presided over the many technological transformations that have led to the networked environments of today, *Computerworld* asked a few of them about the changes they have seen and how they have managed to stay afloat.

### Renee Held

Network manager at  
Fleisher Manufacturing, Inc.  
in Columbus, Neb.

### RECENT CHALLENGE

*"I've really had to work at teaching my users to use the network properly."*

Held's trial by fire and progression toward becoming network manager of a 24-node Novell, Inc. network began almost immediately after she was hired by Fleisher to write Cobol code for its mainframes. Six months after coming on board, the data processing manager resigned, leaving her alone at the controls.

Held brought herself up to speed by reading manuals and taking vendor courses.

She also says she feels fortunate that her company let her grow into each new technology — one transition was a move from Apple Computer, Inc. AppleTalk to

Novell NetWare. Held found AppleTalk and NetWare similar to manage but says she felt the PCs that came into the building with the Novell network were much harder to configure. With the Macintoshes, setup is done in the system file but with PCs, there are .INI files (initialization files) all over the place, she says.

Today, Held continues to do a little Cobol programming in a terminal emulation window on her PC while monitoring the NetWare network in another. Fleisher also recently expanded the network to another building via fiber-optic cable.

"The main way my life has changed is the number of users I support," she says. "When I started there were only four terminals, and we shared them. Today there are close to 50 devices on our network in two buildings." As a result, she spends more time doing help desk-type work.

"The job I have now would be very difficult to walk into because of the variety of things I've picked up over time," she says.

### Scott Baker

Network manager at Jeanette  
District Memorial Hospital  
in Jeanette, Pa.

### RECENT CHALLENGE

*"Network technology advances make jobs easier, but the management of the system gets more and more difficult."*

When Baker was earning his bachelor's degree in computer science in the mid-1980s, he took just about all the computer-oriented classes offered — none of which had anything to do with networking or network management.

Since then he has taken a wide variety

of training classes. And, because Jeanette will be cutting over entirely to NetWare 3.1.1, Baker will soon begin Certified NetWare Engineer (CNE) classes as well.

"I was the computer operator on a VAX 6000-class machine when the need for a network manager came up about five years ago," Baker says. Currently, he supports roughly 85 networked devices ranging from leftover IBM 8088 machines to brand-new Intel Corp. i486-based PCs. He is still working to become an "all-purpose PC and networking guy," he says.

Baker got started in network management through the help of the consulting firm that installed the networks.

### Vance Everett

Network manager at Brigham Young  
University's Law School  
in Provo, Utah

### RECENT CHALLENGE

*"We're integrating images into our FoxPro databases that are distributed across the network. We've had to play with the databases' parameters and the hardware so the images don't slow the network down."*

Even though Everett's background contrasts sharply with Held's, how he ended up riding shotgun on a 200-plus node Novell network of IBM PCs, Digital Equipment Corp. VAXs, communications and database servers is eerily similar.

"I don't know if you really train to be a network manager so much as you fall into it," Everett says. "You get into a job and people say they need someone to

manage the network. They look around, say 'You're it,' then you take classes to learn the new technology while learning on the job."

Everett has a programming-oriented degree, has taken graduate-level classes in networking and has earned CNE status from Novell.

"One of the nice things about network management is it's becoming a lot easier than it used to be," Everett says, pointing to management standards for networked devices such as Simple Network Management Protocol. He relies on a network management system from Network General Corp. called NetMon and starts troubleshooting only after it flags a problem. He can also use Network General's Sniffer packet analyzer if he and NetMon are stumped.

Panepinto is a free-lance writer in Amherst, Mass.

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# Learning the graphical way



By David Baum

It's no secret. Users are demanding graphical, forms-oriented applications for their new PCs and Macintoshes, and information systems professionals must step up to the plate to deliver them — fast. But how can an average corporate developer hope to create in-house applications that compare with the slick, well-designed commercial ones to which users have become accustomed?

IS departments are wrestling with a slew of new graphical development environments that bear little similarity to the procedural languages they grew up with. Event-based application processing requires a fundamental shift, both technically and psychologically, that many procedural programmers find difficult to make.

"One of the biggest adjustments to graphical, nonprocedural tools is that you can't print out your whole program in linear fashion," says Jim Fawcette, editor of the *Visual Basic Programmers Journal* in Los Altos, Calif. "There is code hiding behind your forms that you can't see. Developers must take it on faith that these black boxes will work as specified."

By black boxes, Faw-

cette means predefined functions that can't be tinkered with and whose code is hidden from view. These out-of-the-box functions can be plugged into applications with minimal effort but cannot be changed or analyzed.

## Automating events

Event-driven programming automates the total combination of events that can take place when an application is run. Procedural programming is more static: The developer must write code for each step that has to take place, and programs execute in a linear fashion. Therein lies the major difference between the two worlds, Fawcette says.

Ann Shukla, director of worldwide marketing at Uniface Corp., has watched many of her company's customers struggle with these issues as they learn to use the Uniface event-driven fourth-genera-

tion language environment. The key to getting past the hurdles, she says, is a comprehensive training program.

"We have found that it is very important to address all the fundamentals of the new computing landscape," Shukla says. "In addition to training in our application development environment, we touch on related topics, such as relational theory, object modeling and design, graphical screen designing and conceptual data modeling."

Others have a slightly different approach. Tim Nelson, chief scientist at SHL Systemhouse, Inc., a systems integrator specializing in application development issues, for instance, finds that introducing a language-oriented workbench, such as MicroFocus, Inc.'s MicroFocus Cobol Workbench, eases the transition. This development environment integrates a familiar mainframe syntax

within the graphical operating system of workstations and PCs, making it much easier for programmers to feel comfortable with the new machines.

"Because the same set of tools can be used in the same fashion on different platforms, companies can make a smooth transition off of the mainframe to a variety of PC and Unix environments without becoming overwhelmed by the complexities of those environments," Nelson says. With this comfort comes the confidence to exploit the workstation environment in new ways.

## Cobol migration

There are also ways to encapsulate existing Cobol procedures into Dynamic Link Libraries using the MicroFocus Cobol tools. Programmers migrating Cobol applications to a windowing environment may find them helpful because they don't have to start from scratch. The tools also give them a sense of the black box concept, using procedures they have written and tested.

Meanwhile, Fawcette recommends that procedural programmers become familiar with Microsoft Corp.'s Visual Basic and its many add-on tools.

"For a Cobol programmer moving into Windows, these tools are a godsend," Fawcette says. "Without them, you would have to master the Windows API, which would be a very difficult task."

Baum is a free-lance writer in Santa Barbara, Calif., who specializes in emerging technologies.

## EVENT-DRIVEN VS. PROCEDURAL PROGRAMS

### EVENT-DRIVEN PROGRAMS

- Automate the total combination of events that can take place when an application is run.
- Make use of predefined components and libraries of high-level functions.
- Rely on "black box" objects that can be used interchangeably in many applications.
- Run primarily on workstations and PCs.
- Can be prototyped quickly without much attention to a formal methodology.
- Incorporate sophisticated graphical interfaces.
- Used primarily for tactical departmental and workgroup applications where performance is not the leading concern.

### PROCEDURAL PROGRAMS

- Execute in a linear fashion.
- Require the developer to write code for each step in an application.
- Run on all types of machines, from mainframes to PCs.
- Usually created with a structured programming methodology.
- Geared for character-mode screens.
- Commonly used for corporatewide, mission-critical applications where performance is a leading concern.

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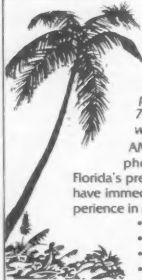
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**SR SOFTWARE ENGINEER (REF. #20683)** to analyze, design, develop & implement comp s/w for clients' EDI sys, incl enhancing & customizing the CHES (an MRP package) and redesigning its modules, database modifications & sys testing. Duties: porting s/ware to various platforms incl UNIX, VMS, & MVS; integration of various modules & integration testing; customizations & user training using IBM RS 6000, VAX 6000, AIX, PRO, & C under UNIX & VMS. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: s/ware design, development, integration & testing; user training; & using PRO/4V, VMS, C & UNIX. Pay is \$34,000/yr. 40 hr/wk.

**PROGRAMMER/ANALYST (REF. #25683)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, including analyzing, designing, developing & implementing comp s/w for clients' EDI sys, incl a centralized on-line CORPORATE MIS REPORTING sys incl data flow design, data analysis, data modeling, database & app design & tech support for developing & implementing insurance business sys. Technical support provided will be on the IBM 3900, 4381 & IBM PS/2 hardware & the following s/ware & languages: MVS/ESA, CASE Tools, DB2, TSO/ISPF, APPLICATION SYS/AS, FOCUS, I-2, VMS, SQL/DS, COBOL, SPURF, IBM JCL, CICS, UACR, REXX, CLISTS, PERSONAL APPLICATION SYS/ESTRIEVE, Microsoft EXCEL, LOTUS 1-2-3, ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, development & implementation of Corporate MIS sys & using IBM 4381, VM/SP, SOLIDS, REXX & FOCUS. Pay is \$34,000/yr. 40 hr/wk.

**SOFTWARE ENGINEER (REF. #25493)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, including analyzing, designing, developing & implementing comp s/w for clients' EDI sys. One specific duty includes development, installation & maintenance of MVS/ESA operating sys & s/ware products on IBM RS 6000 series processors using CBIPO & CBIPO al ware packaging methods, & development of productivity tools. Duties require using IBM ES 9000 series, 3090, 4381, P/4V, MVS/ESA, MVS/ESA, Graphical Interface BOSS on SINTRAN, C, COBOL, JCL, DOS, JES2, SMP/E, DITTO, CMS, CICS & DB2. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, development & implementation of IBM 3090, ES 9000, MVS/ESA, MVS/ESA, Graphical Interface BOSS on SINTRAN, P/4V, MVS/ESA, MVS/ESA, Graphical Interface BOSS on SINTRAN. Pay is \$33,155/yr. 40 hr/wk.

**SOFTWARE ENGINEER (REF. #33793)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, including analyzing, designing, developing & implementing comp s/w for clients' EDI sys, incl designing, developing, analyzing, implementing, maintaining & supporting IBM/390, IBM PC/AT, MVS/ESA, IMS/DC, TELON, COBOL, DB2, ADW used for sys design & ADW/MS, ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, application s/ware development; financial sys customization; sys implementation; & using UNISYS A & V series, COMS, DMS II, VCS, COBOL & medium sys & Motorola 68000 assemblers. Pay is \$34,000/yr. 40 hr/wk.

**SYSTEMS ANALYST (REF. #33983)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, including analyzing, designing, developing & implementing comp s/w for clients' EDI sys incl enhancing & customizing the BAMCS (Business & Manufacturing Control Sys) & CASTS (Computerized Accounting & Student Terminal Sys) packages incl redesign of modules, database modifications & sys testing. Duties require using Unisys A Series with COMS, DMSII s/ware under MCP/AS operating environment & COBOL & ALGOL programming languages. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, development, installation & customization of manufacturing control app sys incl BAMCS, & using UNISYS A series, B-28, COMS, CANDE, DMS II, SDF, LINC II & WPL. Pay is \$34,000/yr. 40 hr/wk.

**PROGRAMMER/ANALYST (REF. #36193)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, incl analyzing, designing, developing & implementing comp s/w for clients' EDI sys incl an integrated software sys incl process/data flow design, data modeling identification, technical support, overall design & development of Work Program part of the sys. Technical support for design of app using Structured and design methodologies & techniques & IBM 3900, IMS DB/DC, DB2, VCS, COBOL, FILE-AID, TELON, IMS-SPERT, PANAPT, ABEND-AID, Info-Manager, REXX, CLIST, C, C++, COBOL & CAP. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, design, development, testing & implementation of app & batch sys; providing technical support to end users; & using IBM 3900, IMS DB/DC, VCS, COBOL II, DB2, CICS, JCL, REXX, CLIST, OAM, CAF, Structured Anal & design techniques. Pay is \$34,000/yr. 40 hr/wk.

**SOFTWARE ENGINEER (REF. #36293)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, including analyzing, design, develop & implement s/ware for clients' EDI sys, incl analyzing, design & development of manufacturing information app using object oriented design, C++ programming, creating graphic user interfaces based on the Motif architecture & creating SQL queries to access the relational database, writing test programs for testing sys before releasing & using VAX/VMS operating sys, Rdb/VMS relational database, UNIX, SQL, Motif & C++. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, graphics s/ware design; writing test programs; & using UNIX & C++. Pay is \$34,000/yr. 40 hr/wk.

**SYSTEMS ENGINEER (REF. #36393)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, including analyzing, designing, developing & implementing comp s/w for clients' EDI sys, incl installation, enhancement & customization of BAMCS (Business & Manufacturing Control Sys) & redesign of its modules, database modifications & sys testing. Duties require using Unisys A Series with COMS, DMSII s/ware under MCP/AS operating environment & COBOL & ALGOL programming languages. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, development, installation & customization of manufacturing control app sys incl BAMCS, & using UNISYS A series, COMS, DMS II, MCP/AS, COBOL & ALGOL. Pay is \$34,000/yr. 40 hr/wk.

**PROGRAMMER/ANALYST (REF. #39893)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, including analyzing, designing, developing & implementing comp s/w for clients' EDI sys, incl analyzing, database design & development of a directory publishing app. Duties include end-user interface for req defn, data modeling using E-R modeling techniques, & tech support for design of apps using VAX 6620, VMS 5.5, Oracle RDBMS 3.0, PL/SQL, SQL\*PRO, SQL\*REPORTWRITER, SQL\*MENU 4.0 and Oracle Case Tools (CASE Dictionary and CASE Generator) & involves Database Administrator Activities (DBA). ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, development of app sys using VAX/VMS, Oracle RDBMS, Oracle Case Tools (CASE Dictionary and CASE Generator), SQL Forms, PL/SQL, and PRO/4V. Pay is \$34,000/yr. 40 hr/wk.

**SOFTWARE ENGINEER (REF. #39993)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, including analyzing, designing, developing & implementing comp s/w for clients' EDI sys, incl development of network related s/ware; admin & enhancement of a data communication network; sys s/ware support for IBM mainframe; & installation & maintenance of s/ware products. Duties require using MVS & s/ware products ACPI/AM, ACPI/PM, CICS & COBOL on IBM 3900 series. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, s/ware installation & maintenance; network admin; & using IBM 3900, MVS operating sys, ACPI/AM & CICS. Pay is \$34,000/yr. 40 hr/wk.

**SOFTWARE ENGINEER (REF. #40093)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, including analyzing, designing, developing & implementing comp s/w for clients' EDI sys, incl development, enhancement & maintenance of Combustion analysis toolkit pkg which is a collection of programs for transforming, analyzing & reducing data acquired from high sampling rate. The toolkit includes programs for data reduction & porting to MS-DOS includes tools for data filtering, Fourier transformation, ensemble statistics & knock signal analysis using various knock algorithms; installation & maintenance of PATHWORKS & basic system management of VAX converting existing R51 routines to C to increase overall efficiency of the pkg; & using IBM VAX, PC, VMS, DOS, RSI & C. ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, app development & enhancement; algorithms development; sys installation; & using VAX, VMS, C & DOS. Pay is \$34,000/yr. 40 hr/wk.

**SOFTWARE CONSULTANT (REF. #40193)** to consult with clients to ascertain & define their business req or problem areas & utilize tech expertise to provide solutions to clients' needs, including analyzing, designing, developing & implementing comp s/w for clients' EDI sys, incl design & development of document processing sys. Duties include design, development, tech support of the image processing sys & meetings with users to gather req & use of Unisys 4380, Unisys 4381, & P/4V installation, & technical analysis. CICS, DOS, MS WINDOWS & UNIX operating sys, PL/1, P/AS, C, C++, INTEL, ASSEMBLY languages, SNAP (SNA Primary) & NPPS (Network Payment Processing Sys). ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal, S/Ware Engg or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: in whole or in part, sys design & using Unisys 4380, 4381, P/4V, CICS, INTEL, ASSEMBLY languages. Pay is \$40,000/yr. 40 hr/wk.

**SYSTEMS ANALYST (REF. #13993)** to analyze, design, develop & implement comp s/w for clients' EDI sys, incl the Integrated Accounting Sys. Responsibilities: analyzing user reqs, process flow design, developing billing algorithms, tech support & data modeling identification. Tech support for design of apps using SLE, VSAM on IBM 3900 using IBM 3900, MVS/ESA, VM CP/CMS, TSO, SLP, VSAM, PL/1, REXX, ASSEMBLY, ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: must incl design & development of business app s/ware; & using IBM 3900, VM CP, CMS, TSO, PL/1, REXX & maintenance of VSAM. Pay is \$34,000/yr. 40 hr/wk.

**SYSTEMS ANALYST (REF. #14093)** to analyze, design, develop & implement comp s/w for clients' EDI sys, incl on-line & batch business app s/ware for a financial sys using IBM 3900 mainframes, IBM s/ware CICS, CSP, DB2, IMS DB/DC, PL/1, CLIST, JCL & utilities & MVS/ESA. Duties: design & development of on-line modules using DB2, IMS DB/DC, PL/1, ED & EXP: Bachelor's in Comp Sc, Engg, Sys Anal or Math & 2 yrs exp in the job offered or 2 yrs exp as Prog, Sys Prog, Prog/Anal, Sys Anal or Consultant. Will accept 3 yrs of college ed plus 3 yrs of exp in the related occupation in lieu of the req'd ed & exp. REL EXP: design & development of on-line app & financial app sys; using IBM 3900, MVS/ESA, CICS, DB2, IMS DB/DC, PL/1, CLIST, JCL & utilities. Pay is \$33,155/yr. 40 hr/wk.

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**Systems Analyst - Analyze user reqs, prepare software specs, design, develop and implement info. anal financial mgmt systems on IBM AS/400 hardware under MVS/ESA using S/VSAM and RPG/400 and COBOL/400 languages and ADW Case tool. 40 hrs/wk. \$49,000/yr. Req. Master deg. in Comp. Sci. or Math and 2 yrs. exp. or as Programmer/Analyst. Must have proof of legal authority to work permanently in the U.S. 2 copies of resume to Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605, Attention: Machine Counts. Reference #V-I-10706C. NO CALLS. An employer paid ad.**

**Staff Scientist:** Research and develop algorithms for use in production of computer image processing systems for industrial purposes. Will combine one or more central processing boards, real-time pipeline image processing hardware and design total system solutions for various applications in a real-time environment using the OS9 operating system, including algorithms and software development as well as system integration. Will use the resulting system for analysis of products through depth or brightness criteria including implementation of Canny and Markov random field model-based edge detectors in hardware, to insure accuracy of product and conformity of dimensions with production specifications. Requires Ph.D. degree in Computer Science. Also requires two months experience in the job to be performed or two months experience as an intern. If experience in related field, experience must be in the implementation of an entire image processing system used for inspection of industrial objects. Ph.D. thesis in image processing involving detection of low level features in images using Markov random field model-based Canny edge detectors. OS9 operating system and programming using multiprocessors. Hours: 9:00 a.m. - 5:00 p.m. 40 hours per week at \$45,000 per year. Send resume to: Madison Job Service Office, 206 Broad Street, Madison, WI 53703, ATTN: Chris Richard, Case #30195, An Employer Paid Ad.

**SOFTWARE ENGINEER -** Perform requirement analysis and design alternatives that satisfy requirements and specifications. Estimate time and resources needed to complete project. Develop software design based on requirements and preliminary design. Perform coding and testing documentation. Troubleshooting and customer support for projects. Salary: \$769.00 per week 40 hours per week (8:00 a.m. - 5:00 p.m.) Requirements: Bachelor of Science in Computer Science or Electronic Engineering; applicant must have completed the following graduate level courses: Introduction to Operating Systems; Advanced Operating Systems; Computer Networks; Algorithms; and File Systems. Send resumes to MESC, 7310 Woodward, Rm. 415, Detroit, MI 48202 (Ref. #17193). Employer paid ad.

### Computer Programmer/Analyst

Responsible for assisting clients in the analysis, installation and maintenance of engineering design systems. Provides and supports client support and solutions on design and implementation. Must be able to demonstrate computer use in CAD, Rail, II, Analog and Digital circuit design, low noise circuit design, printed circuit board design, and PSpice. B.S. in Electrical Engineering or Computer Science. One year's experience or one year's experience in engineering. 40 hrs. 9-5pm. \$31,200.00 p.w. Must have proof of legal authority to work permanently in the U.S. To apply send TWO copies of resume to: Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605, Attention: Machine Counts. Ref. #V-I-1063C. NO CALLS. AN EMPLOYER PAID AD.

**SYSTEMS ENGINEER -** 40 hrs./wk., 8am-5pm, \$43,500/yr. To analyze user requirements and prepare functional specifications. Implement computer systems and networks. Design and develop computer software systems using CASE Tools and RDBMS. Require Master's degree in Computer Science, Computer Applications or Electrical Engineering. 3 yrs. exp. in 3 yrs. exp. or as Systems Analyst/Programmer/Engineer/Consultant. Programming experience utilizing X-Windows, C, 4GL, RDBMS required. "Employer paid ad." E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref. #33933.

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**COMPUTER PROGRAMMER/ANALYST II** - Analyze design, develop, implement and revise databases and computer programs. Consult with users on the utilization of computerized information retrieval and application packages. Provide educational services which include teaching scheduled short courses, lecturing as requested in academic classes, and providing other services which may be required for new and revised systems. Provide assistance to application programmers and users with problems involving interfacing with operating systems. Review software and make appropriate recommendations. Salary - \$28,000 per yr/40 hr week. Requirements: A bachelor's degree in Computer Science or its equivalent. Two to three years experience in computer programming, including the use of operating system facilities on PC and mainframe. One year of PC level programming experience, in addition to UNIX, COBOL, and C languages. Hospital application system design experience. Send resumes to: University Hospital & Clinics, Information Services, ATTN: Patient Services Manager, 1400 RQC, Dc017.00, Rm 156, Columbia, MO 65212.

Computer Systems Programmer/Analyst. Supporting design, scheduling, testing/debugging, installation, & on-going maintenance of computerized systems including files & programs for US & Pacific Rim operations. Must meet following minimum requirements: B.S. degree in Comp. Sci. or CIS; experience in AS/400, RS6000, VAX, IBM 4381, RPO/400, RPGII, COBOL, C, LINDO; must be available for foreign travel (Pacific Rim countries) up to 25% of time; must have proof of legal authority to work in the United States; 40 hrs/week; \$35,015 per year. The job order number for this job opportunity is KS 6001021. Please apply at Wichita Dept of Human Resource Office, 402 E. 2nd, PO Box 877, Wichita, KS 67201-0877. Tel. # (316) 266-8600. Or refer to job order number when submitting resume to the above referenced office. Do not submit resumes if Alien Certification Officer.

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The successful candidate will have at least a Bachelor's degree, 4 years experience in system analysis and project management in a profitability focused environment, and 3 years of experience in applying structured analysis and project management methods. The successful candidate will be a strong, resilient leader with high self-expectation and motivation, and excellent analytical, critical and creative thinking abilities.

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# Marketplace

## The scoop on imaging VARs

By Joe Panepinto

If you're in the market for a document imaging system, you may end up dealing with a value-added reseller (VAR). Imaging vendors use VARs more and more often to sell and support their products, especially system components or smaller turnkey systems that list for less than \$500,000.

Unfortunately, the markup on such services can be as steep as 30% to 40%. So what can you expect to pay?

Pinpointing the price of a typical document imaging system is nearly impossible because most solutions include a range of equipment. For instance, scanners run from \$2,000 to more than \$10,000, depending on processing speed. Optical storage subsystems can be erasable or write-once read-many, stand-alone or jukebox and range from roughly \$5,000 to more than \$200,000. Monitors run from around \$2,000 to nearly \$10,000.

Software is generally the cheapest — you can get some PC-based imaging software for less than \$100 per seat — but the average is \$500 to \$1,000.

How much you allocate for each piece depends on your needs, but some believe there are general

rules for buying from a VAR. Don Gillette, president of CEG Technologies, Inc., a systems integrator in Anaheim, Calif., says the price of a VAR-installed document imaging system should be 25% hardware and 75% software and services. Since the real advantages of imaging come from the way it is implemented rather than the technology itself, software and services should predominate, Gillette says.

On the other hand, David Rose, document imaging product marketing manager at Sigma Designs, a document imaging display vendor that sells largely through VARs, says just the opposite — end users should pay roughly 75% for hardware and 25% for software and services.

As expected, the ratio of hardware to software and services in real-life contracts falls somewhere in between. The city of Houston's personnel department, for example, installed a fairly large (\$500,000 to \$1 million) document imaging system, the cost of which was 62% for hardware and

38% for software and services.

The department started from scratch. The employment records of 21,000 current and 18,000 former employees (more than 4 million files) were stored in hard copy on floor-to-ceiling racks and accessed by hand. The department decided to skip over microfiche and go directly to a local-area network-based document imaging system with optical storage.

The resulting request for proposals was very specific about the capabilities of the hardware, the LAN and the software. It detailed what the department expected from the VARs in terms of training and installation time frames.

"Whether you're going through VARs or anyone else, I recommend you make them show you a whole system in actual operation," says Darrell Malone, senior personnel administrator. "There are vendors and VARs out there that like to sell you things that don't exist or don't work."

Panepinto is a free-lance writer in Amherst, Mass.

### Bargaining chip

End-user organizations may want to bargain with VARs to get back-file conversion services and training — two potentially expensive services that are often left out of document imaging system negotiations.

## PUSH FOR THE EXTRAS

There are at least two dozen services that a buyer should demand from an imaging VAR. These include:

### Requirements definition

VARs should help define the problems you want solved with a document imaging system, including the following:

- Problem definition.
- Work-flow volumetrics.
- Organizational structure analysis.
- Backup.
- Record management.
- Return on investment requirements.

### Opportunity analysis

Implementing a document imaging system can severely affect networks as well as work and paper flow. VARs should provide potential clients with:

- A technology investigation.
- Work-flow alternatives.
- Alternative organizational structures.
- An analysis of the impact of imaging on all of the above.

### Vendor selection

End-user companies should clearly outline vendor selection criteria, such as software capabilities, scanner quality, storage capacities and retrieval rates. The VAR should also clearly spell out each vendor's acquisition and contract requirements.

### Proposed solution

A final proposal from a VAR should include not only the system specifications and cost, but also the manner in which the change from existing document practices to the new system will be accomplished.

Source: CEG Technologies, Inc., Anaheim, Calif.

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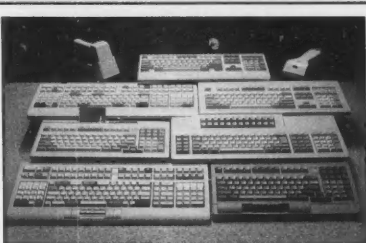
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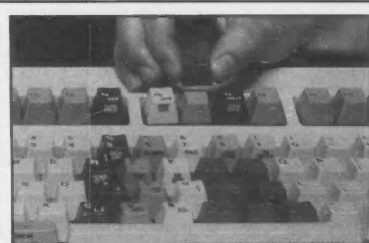


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Percent

Dollar

TELEBIT CORP.	46.7	GATEWAY COMMUNICATIONS (L)	-25.0
BOLY, BERANEK & NEWMAN (H)	37.8	ROSS SYSTEMS	-22.1
COUNTRONICS CORP.	27.0	EASEL CORP.	-17.9
ATMEL CORP. (H)	25.9	TRINIC CORP.	-13.3
NETWORK EQUIPMENT TECH.	25.4	MERISIL	-13.1
LATITUDE SEMICONDUCTOR	24.7	MAXTOR CORP. (L)	-11.5
EMC CORP. (H)	23.4	GUPTA	-10.5
CONSHARE INC.	20.0	RADIUS INC.	-8.8

CABLETRON SYSTEMS	11.88	ROSS SYSTEMS	-2.38
DSC COMMUNICATIONS (H)	7.50	COMPUWARE CORP.	-2.25
PROGRESS SOFTWARE CORP.	7.25	POWERSOFT	-2.13
MOTOROLA INC. (H)	7.13	GUPTA	-2.13
ATMEL CORP. (H)	6.88	BELLSOUTH CORP. (H)	-2.00
EMC CORP. (H)	5.63	SOFTWARE SPECTRUM INC.	-1.75
AMERICAN POWER CONVERSION	5.50	WYXER CORP.	-1.75
INTEL CORP.	5.00	SAPIENS INTL. CORP. N.Y. (H)	-1.63

## Systems software struggles

Investors must be dizzy by now. Many mainframe systems software stocks have gone up and down like a roller coaster during the past several months — most notably **Legent** (LGNT) and **BMC Software, Inc.** (BMS).

Analysts said the sector presents several excellent investment opportunities, but they were less than unanimous on which companies have the best prospects and when valuations would more permanently turn upward.

Legent, which filed its quarterly report last week (see story next page), has suffered the most. Legent shares sank more than 10 points in one day last month when the company previewed its earnings. The company closed Thursday at less than half of its February 52-week high. Earlier in the year, BMC issues bounced from a high of more than 84 points to a low of about 38 points. The stock has since regained 20 points.

Some observers pin the blame squarely on the rumored demise of the mainframe. However, Wall Street analysts said recent evidence suggests the software market is quite solid. The analysts pointed out that a number of systems and utilities software vendors recorded excellent results in the most recent quarter.

For example, BMC's \$65 per share earnings easily eclipsed analysts' expectations. **Boole & Babbage, Inc.** (BOUL) scored a 70% increase in net income, and **Compuware Corp.** (CPWR), **4th Dimension Software, Inc.** (DDDDF) and **Platinum Technology, Inc.** (PLAT) also fared well.

For the most part, stocks in the sector have responded sluggishly, indicating that investors remain somewhat skeptical. However, such pervasive success argues that the mainframe software market is still vital, according to Terence Quinn, managing director at Furman-Selz, Inc. "Two quarters ago, people would have said it's dead," Quinn said. "But BMC's and Legent's shortfalls were due to execution problems not sector problems."

Legent likely has further sales force and product line transitions to undergo before its issues turn around, analysts agreed.

Among other stocks, SoundView Financial Group analyst James Mendelson recommended BMC and Platinum Technology as good short-term opportunities, while Compuware provides strong long-term prospects. Compuware's shares were dragged down earlier in the year when Legent's problems began, but they have largely recovered.

Quinn recommended purchase of **Computer Associates International, Inc.** (CA) and BMC, while Mendelson rated CA as Neutral.

—Derek Slater

EXCH	52-WK RANGE	Aug. 6	WK NET	WK PCT	3 PM	CHANGE	EXCH	52-WK RANGE	Aug. 6	WK NET	WK PCT	3 PM	CHANGE
Communications and Network Services						UP 4.48%	Semiconductors						UP 9.47%
OTC	40.00	10.25	3 COM CORP.	22.50	0.38	1.7	OTC	13.63	6.00	INTERLEAF INC.	7.00	0.63	9.8
NYS	82.25	63.38	AMERICAN INFO TECHS CORP. (H)	82.25	1.00	1.2	OTC	18.00	4.75	INTERPOLY INC. (L)	5.38	-0.13	-2.3
NYS	65.00	40.63	AT&T	62.63	-1.00	-1.6	OTC	16.00	7.75	KNOWLEDGEWARE INC.	11.25	0.00	0.0
OTC	4.06	0.75	ARTTEL COMMUNICATION CORP.	2.81	0.44	18.4	OTC	54.75	15.50	LEGENT CORP.	20.88	0.88	4.4
OTC	24.50	10.25	BANYAN SYSTEMS INC.	19.75	2.75	16.2	OTC	37.00	14.75	LOTUS DEVELOPMENT	36.63	0.13	0.3
NYS	60.13	44.50	BELL ATLANTIC CORP. (H)	58.13	-1.50	-2.5	OTC	23.25	4.50	MATHSOFT INC.	6.75	0.50	8.0
NYS	58.88	46.75	BELLSOUTH CORP. (H)	56.00	-2.00	-3.4	OTC	11.63	2.00	MCA SOFTWARE	4.75	-0.38	-7.3
NYS	12.75	3.63	BELL, BERANEK & NEWMAN (H)	12.75	3.50	37.8	OTC	12.00	5.25	MENTOR GRAPHICS	9.25	0.75	8.8
OTC	18.50	9.25	BROOKTRUST TECHNOLOGY	12.75	-1.00	-7.3	OTC	46.00	26.63	MICRO FOCUS	27.25	-1.00	-3.5
NYS	114.25	52.13	CABLETRON SYSTEMS	114.25	11.88	11.6	OTC	13.25	4.38	MICROGRAFI INC.	4.13	0.06	1.0
OTC	26.50	5.88	CENTRIM COMMUNICATIONS	26.50	1.50	6.0	OTC	98.00	48.00	MICROSOFT CORP.	74.75	1.00	1.4
OTC	51.00	19.00	CHIPCOM CORP.	51.00	4.50	9.7	OTC	53.00	15.50	MICROSOFT CORP.	53.00	2.50	5.0
OTC	57.25	22.13	CISCO SYSTEMS INC.	56.50	4.50	8.7	OTC	37.13	18.38	PARAMETRIC TECHNOLOGY	37.13	2.13	6.1
OTC	16.38	5.50	COMPRESSION LABS INC.	13.63	0.63	4.8	OTC	40.50	22.50	PROFESSOR	21.25	1.00	3.3
OTC	36.00	13.00	CROSSCOM	28.25	2.13	8.1	OTC	7.13	3.50	PHOENIX TECHNOLOGIES	4.50	0.13	2.9
OTC	4.63	1.38	DATA SWITCH CORP.	2.88	0.00	0.0	OTC	40.00	22.00	POWERSOFT	28.75	-2.13	-6.9
NYS	88.88	12.38	DIGITAL COMM. ASSOC.	13.38	0.00	0.0	OTC	41.50	17.50	PLATINUM SOFTWARE	36.88	3.38	10.1
OTC	12.75	4.00	DIGITAL SYSTEMS INT'L INC.	4.50	0.25	5.9	OTC	25.00	10.75	PLATINUM SOFTWARE	12.50	0.00	0.0
OTC	62.25	5.88	DSC COMMUNICATIONS (H)	62.25	7.50	13.7	OTC	61.50	32.50	PROGRESS SOFTWARE CORP.	50.75	7.25	16.7
OTC	9.50	4.75	FIBRONIC INT'L INC.	5.63	0.13	2.3	OTC	7.38	2.56	QUARTERDECK OFFICE SYS.	5.00	-0.19	-5.9
OTC	24.00	8.75	FILENET CORP.	12.25	0.25	2.1	OTC	32.00	14.25	RAINBOW TECHNOLOGIES INC.	25.00	-0.50	-2.0
OTC	4.38	1.50	GANDALF TECHNOLOGIES INC.	2.75	-0.13	-4.3	OTC	10.75	4.00	RASTROPS	8.50	0.25	3.0
OTC	2.06	0.84	GATEWAY COMMUNICATIONS (L)	0.84	-0.20	-25.0	OTC	15.25	3.63	SAPIENS INTL. CORP. N.Y. (H)	21.25	1.63	8.1
NYS	15.75	2.88	GENERAL DATABANK INDUS.	9.50	0.00	0.0	OTC	14.50	5.00	SOFTWARE PUBLISHING CORP. (L)	5.75	0.13	2.2
OTC	3.75	2.00	GO VIDEO	2.44	0.06	2.7	OTC	12.75	2.38	SOFTWARE TOOLWORKS INC. (L)	12.50	0.25	2.0
NYS	37.75	32.38	GTE CORP.	37.75	3.25	8.6	OTC	2.88	0.75	SPINNAKER SOFTWARE	13.50	1.00	7.4
NYS	90.75	62.75	ITT CORP. (H)	89.75	1.00	1.1	OTC	13.00	3.25	STATE OF THE ART (H)	11.00	-1.00	-8.3
OTC	29.88	16.06	MCI COMMUNICATIONS CORP. (H)	28.50	0.50	1.8	OTC	24.63	15.00	STERLING SOFTWARE INC.	22.25	-0.13	-0.6
OTC	6.50	1.50	MICROCOM INC. (L)	2.88	0.00	0.0	OTC	21.50	8.00	STRUT. DYNAMICS RESEARCH	20.63	0.88	4.4
OTC	24.25	5.00	NETRIX CORP. (L)	4.00	0.25	6.7	OTC	77.50	26.50	SYBASE INC.	75.50	2.50	3.5
OTC	19.00	7.00	NETWORK COMPUTING DEVICES (L)	7.75	0.25	3.3	OTC	19.25	5.88	SYMANTEC CORP.	13.13	1.63	12.0
NYS	15.00	5.38	NETWORK EQUIPMENT TECH.	9.25	1.88	25.4	NYS	12.50	5.25	SYSTEMS CENTER INC.	10.25	0.00	0.0
OTC	20.13	8.00	NETWORK GENERAL	11.63	0.13	1.1	OTC	25.50	10.00	SYSTEM SOFTWARE ASSOC.	22.00	2.00	10.0
OTC	15.75	6.88	NETWORK SYSTEMS CORP. (L)	7.25	0.13	1.8	OTC	6.38	2.75	TRINIC CORP.	3.25	-0.50	-13.3
OTC	59.75	7.50	NEWBRIGHT NETWORKS CORP. (H)	59.75	4.00	7.2	OTC	22.75	10.00	VIEWLOGIC SYSTEMS	22.00	1.00	4.8
NYS	46.00	31.38	NORTHERN TELECOM LTD.	21.50	0.63	2.6	OTC	23.50	5.50	WALKER INTERACTIVE SYSTEMS (L)	13.40	0.30	2.4
OTC	35.25	17.63	NOVELL INC.	23.00	2.25	10.8	OTC	3.19	1.31	WORSTADT	1.31	0.03	2.4
OTC	92.50	79.00	NYNEX CORP.	88.38	-1.75	-1.9							
OTC	30.00	14.50	OCTEL COMMUNICATIONS CORP.	22.00	-1.63	-6.9							
OTC	6.13	3.38	PENRIL DATA COMM NETWORKS	4.00	-0.25	-5.9							
OTC	30.50	20.25	PICTURETECH	17.25	-0.50	-2.8							
OTC	25.25	16.53	PROTEOM INC.	20.13	-0.13	-0.6							
NYS	35.00	16.34	SCIENTIFIC ATLANTA INC.	34.13	3.63	11.9	NYS	32.88	8.38	ADVANCED MICRO DEVICES	27.88	4.13	17.4
NYS	40.50	31.75	SOUTHWESTERN BELL CORP.	40.38	0.13	0.3	NYS	23.63	9.38	ANALOG DEVICES INC. (H)	23.13	2.25	5.7
OTC	46.63	27.25	TELECOM SYSTEMS INC.	39.50	0.88	2.3	OTC	33.38	7.63	ARMEL CORP. (H)	33.38	6.88	25.9
NYS	36.63	22.25	SPRINT CORP. (H)	35.50	-0.88	-2.4	OTC	39.75	13.00	CIPHER DATA CORP.	25.50	0.50	2.0
OTC	27.00	11.38	STANDARD MICROSYSTEMS CORP.	18.13	0.75	4.3	NYS	55.00	7.88	CYPRESS SEMICONDUCTOR CORP. (H)	15.63	0.50	3.3
OTC	18.50	7.75	STRATACOM INC.	12.50	0.50	4.2	OTC	15.50	8.38	DALLAS SEMICONDUCTOR	15.50	0.88	5.8
OTC	42.75	10.75	STRATUS COMMUNICATIONS	30.38	0.13	15.7	OTC	60.63	27.13	INTEL CORP.	57.00	5.00	9.6
OTC	7.00	3.75	TELEBIT CORP.	5.50	1.75	46.7	NYS	18.38	4.88	LSI LOGIC CORP. (H)	18.38	2.00	12.2
OTC	9.88	2.25	TELEMETRICS INT'L INC.	8.88	0.75	8.2	OTC	11.66	4.50	LATTICE SEMICONDUCTOR	22.75	0.75	3.4
OTC	28.50	14.00	US ROBOTICS (H)	28.00	0.75	2.8	NYS	49.38	14.38	MICRON TECHNOLOGY (H)	49.38	3.88	8.5
NYS	47.75	35.25	U.S. WEST INC.	46.25	-0.75	-1.6	NYS	97.38	41.38	MOTOROLA INC. (H)	97.38	7.13	7.9
OTC	55.50	17.25	WELFLEET COMMUNICATIONS	53.75	2.25	4.4	NYS	17.75	9.88	NATIONAL SEMICONDUCTOR	17.75	1.38	8.4
OTC	17.25	7.25	XIRCOM	16.75	0.25	1.6	OTC	5.88	2.56	SABER SEMICONDUCTOR	5.88	0.25	4.0
PCs and Workstations						UP 1.07%	OTC	51.00	23.00	SYNOPSIS	51.00	2.00	4.1
OTC	5.56	2.50	ADVANCED LOGIC RESEARCH	3.00	-0.25	-7.7	NYS	76.50	36.75	TEXAS INSTRUMENTS	75.13	3.88	5.4
OTC	65.25	25.25	APPLE COMPUTER INC.	30.25	2.25	8.0	OTC	12.63	2.63	WETTER	10.88	-0.88	-7.4
OTC	24.25	11.25	AST RESEARCH INC.	14.63	-0.38	-2.5	ASE	9.63	3.63	WESTERN DIGITAL CORP.	4.88	0.75	18.2
OTC	9.50	2.50	AT&T	3.50	0.25	7.2	OTC	33.00	15.34	ZILOG INC.	28.50	4.00	16.3
NYS	61.75	27.75	COMPAG COMPUTER CORP.	49.75	2.63	5.6							
OTC	49.88	13.50	DELL COMPUTER CORP.	19.88	-0.25	-1.2							
OTC	89.25	50.25	HEWLETT PACKARD CO.	71.50	-0.50	-0.7	OTC	45.00	15.50	AMERICAN POWER CONVERSION	45.00	5.50	13.9
NYS	39.75	17.63	SILICON GRAPHICS	34.38	0.13	0.4	OTC	20.15	5.00	BANCTEC INC.	18.50	0.25	1.4
OTC	41.00	24.00	SUN MICROSYSTEMS INC.	29.13	-0.50	-1.7	OTC	18.00	4.00	CAMERX CORP. (L)	4.25	-0.25	-5.6
NYS	32.38	22.25	TANDY CORP.	23.50	1.00	3.5	ASE	18.38	3.88	COUNTRONICS CORP.	5.88	1.25	27.0
OTC	20.00	7.75	TEC INTERNATIONAL LTD.	3.25	0.25	8.3	OTC	38.50	10.75	CREATIVE TECHNOLOGIES INC.	20.88	-0.38	-1.8
Large Systems						UP 0.71%	OTC	11.00	2.00	DATA-RACE INC.	14.50	1.75	13.7
ASE	15.13	4.63	AMDAHL CORP.	5.25	-0.13	-2.3	ASE	15.38	4.75	DATARAM CORP.	9.13	-0.25	-2.7
NYS	8.75	3.75	CONVEY COMPUTER	3.88	0.00	0.0	OTC	29.63	5.06	EMC CORP. (H)	29.63	5.63	23.4
OTC	6.13	2.25	CRAY COMPUTER	2.63	-0.16	-5.4	OTC	10.50	4.38	EMULEX CORP.	6.13	-0.38	-5.8
NYS	30.88	19.00	CRAY RESEARCH INC.	21.13	-0.50	-2.3	OTC	19.00	13.25	EVANS & SUTHERLAND	19.63	5.63	28.4
OTC	13.88	7.63	DATA GENERAL CORP.	8.00	-0.50	-5.9	OTC	30.38	7.50	EXAMTE	8.75	0.00	0.0
NYS	49.25	30.38	DIGITAL EQUIPMENT CORP.	30.50	0.63	1.7	OTC	28.75	7.09	INTELLIGENT INFO. SYSTEMS	27.00	0.00	0.0
NYS	43.38	28.38	HARRIS CORP.	42.25	-0.75	-1.7	OTC	8.88	3.63	IOEMGA CORP.	3.63	-0.13	-3.3
NYS	89.13	41.13	IBM	43.25	-0.75	-1.7	OTC	15.75	4.75	IPL SYSTEMS INC.	8.88	-0.13	-1.4
OTC	22.00	5.50	KESDAL SQUARE RESEARCH	12.50	0.50	3.6	OTC	24.00	14.00	KONIGSBERG CORP.	24.00	0.00	0.0
NYS	129.50	83.00	MATSUSHITA ELECTRONICS	129.50	4.50	3.6	OTC	19.63	4.63	MASTON CORP. (L)	4.63	-0.63	-11.9
OTC	23.75	8.25	NETRAME	14.75	-0.25	-1.7	OTC	10.75	5.75	MICROPOLIS CORP.	6.13	-0.13	-2.0
OTC	17.25	9.25	PARALLAN COMPUTER	15.75	-0.38	-2.3	OTC	117.00	97.00	3M CORP.	106.88	0.88	0.8
OTC	21.00	6.00	PYRAMID TECHNOLOGY	19.00	0.75	4.1	OTC	7.75	4.00	PRINTRONIX INC.	6.25	-0.13	-2.0
OTC	24.00	11.25	SEQUENT COMPUTER SYS.	14.25	1.38	10.7	NYS	17.25	6.88	QMS INC.	9.63	0.63	6.9
OTC	19.00	7.00	STRATUS COMMUNICATIONS	2.00	0.06	3.3	OTC	9.50	4.38	RADISYS CORP.	9.50	0.38	4.0
NYS	48.38	21.00	STANTUM COMPUTER INC. (L)	22.63	0.75	3.4	OTC	10.88	3.13	RADIOS INC.	3.88	-0.38	-8.8
OTC	16.88	9.63	TANDON COMPUTERS INC. (L)	10.00	-0.38	-3.6	NYS	16.50	7.88	RECOGNITION EQUIPMENT	13.25	1.25	10.4
OTC	16.63	7.25	TECNOLOGIA SYSTEMS INC. (H)	7.25	-1.50	-20.7	OTC	17.25	6.25	RESEARCH SYSTEMS	27.63	2.63	9.4
NYS	13.88	7.75	UNISYS CORP.	10.25	0.13	1.2	OTC	23.38	12.00	SEAGATE TECHNOLOGY	20.00	5.00	2.6
Software						UP 0.66%	NYS	45.00	18.00	STORAGE TECHNOLOGY	26.63	-0.23	-0.8
OTC	74.00	25.25	ADDSYSTEMS INC.	53.75	3.63	7.2	NYS	88.88	70.25	KERX CORP. (L)	73.00	0.00	0.0
OTC	20.75	10.25	ALBIS CORP.	17.75	0.13	0.7							
OTC	13.50	5.50	AMERICAN SOFTWARE INC.	6.25	0.38	6.5	OTC	23.75	14.88	AMERICAN MGMT. SYSTEMS	16.25	0.25	1.6
OTC	58.13	9.50	ASC COMPUTER SYSTEMS (L)	10.50	0.13	1.2	NYS	4.75	2.38	ANACOMP INC.	2.88	0.00	0.0
OTC	26.75	38.63	AUTODESK INC.	46.00	5.00	12.2	OTC	30.38	16.25	ARCO SYSTEMS INC.	30.38	1.63	5.3
OTC	10.00	2.50	BAUDOT SYSTEMS INC.	3.38	0.25	6.9	NYS	56.13	43.00	AUTO DATA PROCESSING	50.13	0.25	0.5
OTC	43.00	31.00	BGS SYSTEMS INC.	38.25	1.25	4.0	NYS	17.25	12.50	CERIDIAN CORP.	15.25	0.25	1.7
OTC	84.38	37.63	BMC SOFTWARE INC.	52.00	2.50	4.5	OTC	13.13	11.00	CHARTER SYSTEMS INC.	11.00	-1.13	-9.9
OTC	10.00	2.50	BORG SYSTEMS INC.	2.50	0.25	10							

# Computer Industry

## Briefs

### AST posts loss

AST Research, Inc. last week posted fiscal fourth-quarter sales of \$409 million, up 54% from the comparable period last year. A \$125 million restructuring charge related to its purchase of Tandy Corp.'s computer business gave AST an \$87 million loss in the period, compared with an \$18.6 million profit in the same quarter last year. For the year, AST lost \$53.7 million on revenue of \$1.4 billion. Last year, the Irvine, Calif., company earned \$68.5 million on revenue of \$944 million.

### Legent earnings drop

As expected, Legent Corp. reported fiscal third-quarter earnings of \$9.2 million, down 29% from the same period a year ago, on sales of \$100 million, which were also down about 3% from the same period last year. Legent said the dip in performance for the period ended June 30 stemmed from a shortfall in new license revenue in North America and Germany [CW, July 19].

### Chip maker sees red

Chips and Technologies, Inc. reported a fourth-quarter loss of \$9 million, which widened its fiscal 1993 deficit to \$49.1 million. The fiscal 1993 loss included \$23 million in restructuring charges. Fourth-quarter sales were \$33 million, off 36% from the same period last year. Fiscal 1993 sales plunged 31% to \$97.9 million. The San Jose, Calif., chip maker lost \$63.9 million in fiscal 1992.

**SHORT TAKES** Northgate Computer Systems, Inc. eked out a \$527,000 second-quarter profit on sales of \$21.4 million. . . . Edward E. Faber, Computerland Corp.'s founding president, has joined the board of Humbolt, S.D.-based Interactive. . . . A class-action suit alleging securities law violations has been filed against The Santa Cruz Operation, which denied the charges.

## Midrange getting hotter for CA

By Thomas Hoffman  
ISLANDIA, N.Y.

Computer Associates International, Inc.'s impressive first-quarter results were, as usual, buoyed by an increase in its host systems software sales. But although CA's mainframe revenue grew 11% to \$331 million for the period ended June 30, systems software revenue as a percentage of overall sales shrank to 78%, down from 81% of total sales in the year-earlier quarter.

The changes, though minor, may indicate that CA's attempts to make inroads into Unix, desktop and distributed software markets are beginning to have an impact. For example, sales of CA's midrange products, including its IBM Application System/400-based CA-PRMS manufacturing cache, catapulted 131% last quarter to \$37 million.

Because CA has filled a niche with CA-Unicenter by offering what many analysts consider the most comprehensive systems management product available for multi-vendor distributed operating environments, the company could be well on its way to making midrange product sales 25% of total revenue within the next five to 10 years. "CA is making out better than anyone else in that business," said Charles E. Phillips, a financial analyst at Kidder, Peabody & Co. in New York.

### Maybe midrange

Even though midrange sales contributed a mere 9% of overall sales for the first quarter, analysts said they believe revenue could triple if shipments of Unix and networked and desktop versions of CA's Unicenter systems management package begin making an impact during the next six to 12 months.

For example, CA has delivered 4,000 copies of its CA-Unicenter for Unix package to

Hewlett-Packard Co. since July 8. The software, which is being bundled into HP 9000 Model 800 Unix machines as part of a one-year promotional push, could generate revenue approaching \$100 million during the next few quarters at \$20,000 to \$25,000 per license, according to Terence Quinn, a managing director at Furman-Selz, Inc. in New York.

### Noncommittal users

However, because CA-Unicenter for Unix is being offered on the HP boxes with a 120-day free license, not all users will necessarily commit to the package, cautioned Timothy R. McCollum, a financial analyst at Dean Witter Reynolds in New York.

CA executives said it is still too early to forecast what kind of impact the Unicenter orders will have on the company's bottom line.

Quinn said CA will have a better grasp of Unicenter revenue potential once it begins shipping versions to Sun Microsystems, Inc., Novell, Inc. and IBM in December for their respective SunOS, NetWare and AIX and OS/2 software.

Not that CA's mainframe revenue is expected to shrivel up any time soon. Quinn forecasted that CA's systems software sales should continue to experience "low double-digit growth for the next two years."

Analysts said they believe CA's flexible software licensing programs, which the company rolled out in April 1992, have had a favorable impact on the vendor's revenue. "The change in the pricing strategy allows CA to do a better job of servicing their

customers and sell more mainframe software," said Andrew C. Brosseau, a principal at Cowen & Co. in Boston.

Furthermore, Quinn said he believes CA's licensing changes have had a double-edged effect. He said the moves have improved the company's relationships with its customers. As a result, the licensing initiatives have adversely affected competitors that historically have preyed on perceived problems between CA and its installed base, most notably Legent Corp., which last quarter suffered a dramatic dip in earnings (see story at left).

"The list of customers who had been angry with CA is gradually getting shorter as CA's licensing structure has helped improve customer relations," Quinn said.

### Add-on revenue

The bulk of mainframe revenue reportedly comes from customers adding systems management software and utilities. Brosseau said as much as 50% of the most recent mainframe revenue is derived from maintenance.

CA's desktop sales also continued to make gains, posting a 9% increase to \$38 million for the quarter. CA's strategy of delivering desktop versions of its systems management tools should help buttress future sales, Brosseau said.

Some analysts were less enthused about CA's desktop revenue potential compared with its future with Unix products. "CA will pick their niches [for desktop products], but we don't envision them going up against Lotus or Microsoft," Quinn said.

### 3 up, 1 down

The following is a breakdown by platform of CA's first-quarter revenue for the period ended June 30. (Gains and losses compared with first-quarter 1992).

• **Mainframe software revenue:** \$331 million (11% increase).

• **Midrange software revenue:** \$37 million (131% increase).

• **Microcomputer software revenue:** \$38 million (9% increase).

• **Other product revenue:** \$17 million (5% decrease).

## Cognos to target client/server

By Melinda-Carol Ballou  
BURLINGTON, MASS.

Cognos, Inc., purveyor of the PowerHouse fourth-generation language (4GL) and other tools, is pushing to reinvent the company later this year, when it plans to unwrap a new generation of products at its fall user conference. However, it will have to demonstrate better timing and overcome a tendency to undermarket itself, analysts said.

Cognos will be targeting the client/server market with tools for creating distributed applications that will ship in the first half of next year, officials said. The company seeks to capitalize on the need for more robust tools and stronger languages for client/server development.

A new marketing slant will begin with a

different product name to complement the new series, which will include a full PC version and graphical developer's tool. Cognos will also announce multiple relational database management system support for the Unix versions of PowerHouse.

After two consecutive years of losses — approximately \$8 million for fiscal 1993 and approximately \$5 million for fiscal 1992 — revenue increased 2% for Cognos' first fiscal quarter of 1994. Net income, however, was \$100,000 compared with \$200,000 for the same quarter in 1993.



Ron Zambinini: Cognos needs to make 'serious changes'

Incoming Chief Operating Officer Ron Zambinini (formerly vice president of research and development) earlier this year spearheaded a now-completed reorganization, which eliminated about 150 positions.

Analysts said while Cognos' 4GL offering is strong, as are its desktop products such as Im-promptu and PowerPlay, the firm has been perceived as an "ancient 4GL" vendor for the proprietary market. Cognos was hurt by a late, poorly marketed entrance into the Unix arena, said Judith Hurwitz, president of Hurwitz Consulting in Newton, Mass.

Zambinini seemed aware of these problems, noting the company needs to make "serious changes" to avoid its problems in the Unix market and to effectively target the client/server arena.

# Wysiwyg

## Who is your personal hero?

**W**hile working at Paramount Pictures on a project, I recently got to meet my personal hero, Jonathan Frakes, better known as Commander Riker, second in command of the Starship Enterprise on *Star Trek*. He is the executive commander of a spaceship, and he has to deal with a lot of the same things I have to deal with at my job. We are both battling with the competition, and we both need to manage our people. Perhaps these similarities can allow all of us to look at what we do in a less serious way.



**Saverio Merlo**  
Senior vice president of marketing  
Boole & Babbage, Inc.



**V**ladimir Nabokov, who was a Russian author, would be one of my personal heroes. He wrote a variety of fictional novels on life's challenges and personal relationships that earned him notoriety in both Russia and throughout the world. He wrote such novels as *Invitation of a Bezar*, *Invitation of a Bezar* and *Speak Memory* (autobiography).



**Mike Walsh**  
Senior vice president  
Comdisco Systems, Inc.,  
a business unit of  
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## The 5th Wave by Rich Tennant



### Inside Lines

#### No strings attached?

Sources close to Compaq said the company will today announce Prebate, a program that will see it send out 75,000 checks worth \$10,000 to IS managers and another 500,000 checks starting at \$250 to consumers. The promotion is aimed at pushing various bundles of Compaq's LTE Lite 425E, which features an active-matrix monochrome screen and an unconstrained supply. For those who take Compaq's offer, price savings can amount to more than 7% of the bundle cost, the sources said.

#### No stopping innovation

Compaq's Innovate '93 conference, which starts Sept. 13, will feature major product rollouts, including the successor to SystemPro [CW, June 14] and a combination pen and keyboard notebook. Sources briefed on the new servers said there will be three models, all of which will use either the 50-MHz 486DX or Pentium chips. The configurations include a single-processor box, along with either a two- or four-processor box.

#### DASD on the way

The next major products out of IBM's Adstar storage subsidiary are expected in early 1994 and will include a high-performance disk drive that attaches directly to the processor instead of a controller in both RAID and non-RAID versions. There will also be a somewhat slower model that requires a controller. The first model will handle up to 120G bytes of memory at under \$5 per megabyte, predicted International Data Corp. analyst Robert Callery. The other unit, which will sport a scheme to protect data, will go for \$6 to \$7 per megabyte.

#### Follow the leader

DEC hopes to get the Alpha AXP version of Windows NT into manufacturing next week, three weeks after Microsoft started production work on NT releases for the Intel and Mips Technology architectures [CW, Aug. 2]. DEC begs to differ with Microsoft intimations that Alpha NT may be as much as 60 days behind the Intel and Mips versions. DEC expects to hit the streets with NT within a month of the others.

#### Rhyming objects

Poet Software in Santa Clara, Calif., plans to unveil later this month what it claims is the industry's lowest-cost object-oriented database. The product is targeted at lone programmers using Windows-based C++ products from Borland and Microsoft, according to a source at Poet. The company is expected to discount the product's \$139 list price to \$99 until December.

#### Coming clean

At a briefing last week Novell firmed up its AppWare release dates and finally admitted Banyan's Vines to the ranks of network operating system environments that AppWare client applications will hook into [CW, July 5]. Expect the first developer release of AppWare at NetworkWorld in Dallas in October and general availability in May 1994.

Meanwhile, users beta testing NetWare for Internet Protocol have learned, to their discomfort, about the "dark side" to using TCP/IP as the sole transport protocol for NetWare installations, according to Novell's Darrell Miller. Apparently users discovered they had to manually assign TCP/IP addresses to each PC on each of their LANs — which caused them to come back, much chastened, to IPX as their LAN client/server protocol, Miller said. While TCP/IP makes a fine backbone protocol, IPX is better for the LAN environment because it allows you to assign addresses to your PC users "on the fly," Miller said. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537.2413, respectively. Or try Computerworld's 24-hour voice-mail tip line at (508) 820-8555.

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